FCC RF Test Report

APPLICANT	:	Motorola Mobility LLC
EQUIPMENT	:	Mobile Cellular Phone
BRAND NAME	:	Motorola
MODEL NAME	:	XT2347-1
FCC ID	:	IHDT56AN1
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	(NII) Unlicensed National Information Infrastructure
TEST DATE(S)	:	Jun. 12, 2023 ~ Jul. 07, 2023

We, Sporton International Inc. (ShenZhen), would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (ShenZhen), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia

ACCREDITED Cert #5145.01

Sporton International Inc. (ShenZhen)

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People's Republic of China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR352602E	Rev. 01	Initial issue of report	Jul. 13, 2023

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit for U-NII-1/2A/2C	Limit for U-NII-3	Result	Remark
3.1	2.1049 & 15.403(i)	6dB, 26dB & 99% Bandwidth	-	6dB Bandwidth > 500kHz	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power/EIRP	≤ 24 dBm	≤ 30 dBm	Pass	-
3.3	15.407(a)	Power Spectral Density	≤ 11 dBm/MHz	≤ 30 dBm/500kHz	Pass	-
3.4	15.407(b)	Unwanted Emissions	15.407(b) & 15.209(a)	15.407(b)(4)(i) &15.209(a)	Pass	Under limit 3.10 dB at 5432.800 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	15.207(a)	Pass	Under limit 11.16 dB at 0.170 MHz
3.6	15.203 & 15.407(a)	Antenna Requirement	N/A	N/A	Pass	-

Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section “Measurement Uncertainty”

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

1 General Description

1.1 Applicant

Motorola Mobility LLC
222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

1.2 Manufacturer

Motorola Mobility LLC
222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT2347-1
FCC ID	IHDT56AN1
IMEI Code	Conducted: : 357231700047210 Conduction: 357231700039571/357231700039589 Radiation: 357231700039753/357231700039761
HW Version	DVT2
SW Version	T3TC33.12
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Frequency Range	5180 MHz ~ 5240 MHz 5260 MHz ~ 5320 MHz 5500 MHz ~ 5720 MHz 5745 MHz ~ 5825 MHz
Maximum Output Power to Antenna	**<5180 MHz ~ 5240 MHz>** 802.11a : 17.79 dBm / 0.0601W 802.11ac VHT20: 17.84 dBm / 0.0608 W 802.11ac VHT40: 16.32 dBm / 0.0429 W 802.11ac VHT80: 14.84 dBm / 0.0305 W **<5260 MHz ~ 5320 MHz>** 802.11a : 18.41 dBm / 0.0693 W 802.11ac VHT20: 18.50 dBm / 0.0708 W 802.11ac VHT40: 16.76 dBm / 0.0474 W 802.11ac VHT80: 15.30 dBm / 0.0339 W **<5500 MHz ~ 5720 MHz >** 802.11a : 18.38 dBm / 0.0689 W 802.11ac VHT20: 18.42 dBm / 0.0695 W 802.11ac VHT40: 16.89 dBm / 0.0489 W 802.11ac VHT80: 16.75 dBm / 0.0473 W **<5745 MHz ~ 5825 MHz>** 802.11a : 17.40 dBm / 0.0550 W 802.11ac VHT20: 17.43 dBm / 0.0553 W 802.11ac VHT40: 16.04 dBm / 0.0402 W 802.11ac VHT80: 15.72 dBm / 0.0373 W
99% Occupied Bandwidth	802.11a : 16.863 MHz 802.11ac VHT20 : 17.982 MHz 802.11ac VHT40 : 36.923 MHz 802.11ac VHT80 : 76.404 MHz
Antenna Type / Gain	**<5180 MHz ~ 5240 MHz>** PIFA Antenna with gain -3.50 dBi **<5260 MHz ~ 5320 MHz>** PIFA Antenna with gain -3.50 dBi **<5500 MHz ~ 5720 MHz>** PIFA Antenna with gain -3.50 dBi **<5745 MHz ~ 5825 MHz>** PIFA Antenna with gain -4.50 dBi
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)

Note: For 802.11n HT20 / ac VHT20 and 802.11n HT40 / ac VHT40 mode, the whole testing have assessed only 802.11ac VHT20/ VHT40 by referring to their maximum conducted power.

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Specification of Accessory

Specification of Accessory				
AC Adapter 1(US)	**Brand Name**	Motorola(Salcomp)	**Model Name**	MC-331
AC Adapter 1(EU)	**Brand Name**	Motorola(Salcomp)	**Model Name**	MC-332
AC Adapter 1(UK)	**Brand Name**	Motorola(Salcomp)	**Model Name**	MC-333
AC Adapter 1(AR)	**Brand Name**	Motorola(Salcomp)	**Model Name**	MC-336
AC Adapter 1(BR)	**Brand Name**	Motorola(Salcomp)	**Model Name**	MC-337
AC Adapter 1(CHILE)	**Brand Name**	Motorola(Salcomp)	**Model Name**	MC-339
AC Adapter 2(US)	**Brand Name**	Motorola(Chenyang)	**Model Name**	MC-331
AC Adapter 2(EU)	**Brand Name**	Motorola(Chenyang)	**Model Name**	MC-332
AC Adapter 2(AR)	**Brand Name**	Motorola(Chenyang)	**Model Name**	MC-336
AC Adapter 2(BR)	**Brand Name**	Motorola(Chenyang)	**Model Name**	MC-337
AC Adapter 2(BR Local)	**Brand Name**	Motorola(Cliptech)	**Model Name**	MC-337
AC Adapter 3(US)	**Brand Name**	Motorola(AOHAI)	**Model Name**	MC-331
AC Adapter 3(EU)	**Brand Name**	Motorola(AOHAI)	**Model Name**	MC-332
AC Adapter 3(UK)	**Brand Name**	Motorola(AOHAI)	**Model Name**	MC-333
Battery 1	**Brand Name**	Motorola(sunwoda)	**Model Name**	QB50
Battery 2	**Brand Name**	Motorola(cosmx)	**Model Name**	QB50
Bluetooth Earphone	**Brand Name**	Motorola(SGW)	**Model Name**	Moto earbuds 135
USB Cable 1	**Brand Name**	Motorola(Juwei)	**Model Name**	JWUB1580-T03H
USB Cable 2	**Brand Name**	Motorola(Saibao)	**Model Name**	STN-A121A
USB Cable 3	**Brand Name**	Motorola(ISHENG)	**Model Name**	SC18D38574

1.7 Testing Location

Sporton International Inc. (ShenZhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International Inc. (ShenZhen)		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	CO01-SZ TH01-SZ	CN1256	421272

Test Firm	Sporton International Inc. (ShenZhen)		
Test Site Location	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City Guangdong Province China 518103 TEL: +86-755-33202398		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**

	03CH02-SZ	CN1256	421272

1.8 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH02-SZ	AUDIX	E3	6.2009-8-24
2.	CO01-SZ	AUDIX	E3	6.120613b

1.9 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 15 Subpart E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.10-2013
- ISED RSS-247 Issue 2
- ISED RSS-Gen Issue 5

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y plane) were recorded in this report.

b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5180-5240 MHz U-NII-1	36	5180	44	5220
	38*	5190	46*	5230
	40	5200	48	5240
	42#	5210		

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5260-5320 MHz U-NII-2A	52	5260	60	5300
	54*	5270	62*	5310
	56	5280	64	5320
	58#	5290		

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5500-5720MHz U-NII-2C	100	5500	112	5560
	102*	5510	116	5580
	104	5520	132	5660
	106#	5530	134*	5670
	108	5540	136	5680
	110*	5550	140	5700

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5745-5825 MHz U-NII-3	149	5745	157	5785
	151*	5755	159*	5795
	153	5765	161	5805
	155#	5775	165	5825

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
TDWR Channel	118*	5590	124	5620
	120	5600	126*	5630
	122#	5610	128	5640

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
Straddle Channel	138#	5690	144	5720
	142*	5710		

Note:

1. The above Frequency and Channel in "*" were 802.11n HT40 and 802.11ac VHT40.
2. The above Frequency and Channel in "#" were 802.11ac VHT80.

2.2 Test Mode

Final test modes are considering the modulation and worse data rates as below table.

Modulation	Data Rate
802.11a	**6 Mbps**
802.11ac VHT20	**MCS0**
802.11ac VHT40	**MCS0**
802.11ac VHT80	**MCS0**

AC Conducted Emission	Mode 1 : GSM 850 Idle + WLAN Link(5G) + USB Cable1 (Charging from Adapter1) + Battery 1 + Earphone
Remark: For Radiated Test Cases, The tests were performance with Adapter1, Earphone and USB Cable1	

Co-location mode
WLAN 5G 802.11ac VHT80 CH106 Tx + LTE Band 13 Link

Ch. #		U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
		802.11a	802.11a	802.11a	802.11a
L	Low	36	52	100	149
M	Middle	44	60	116	157
H	High	48	64	140	165
Straddle		-	-	144	-

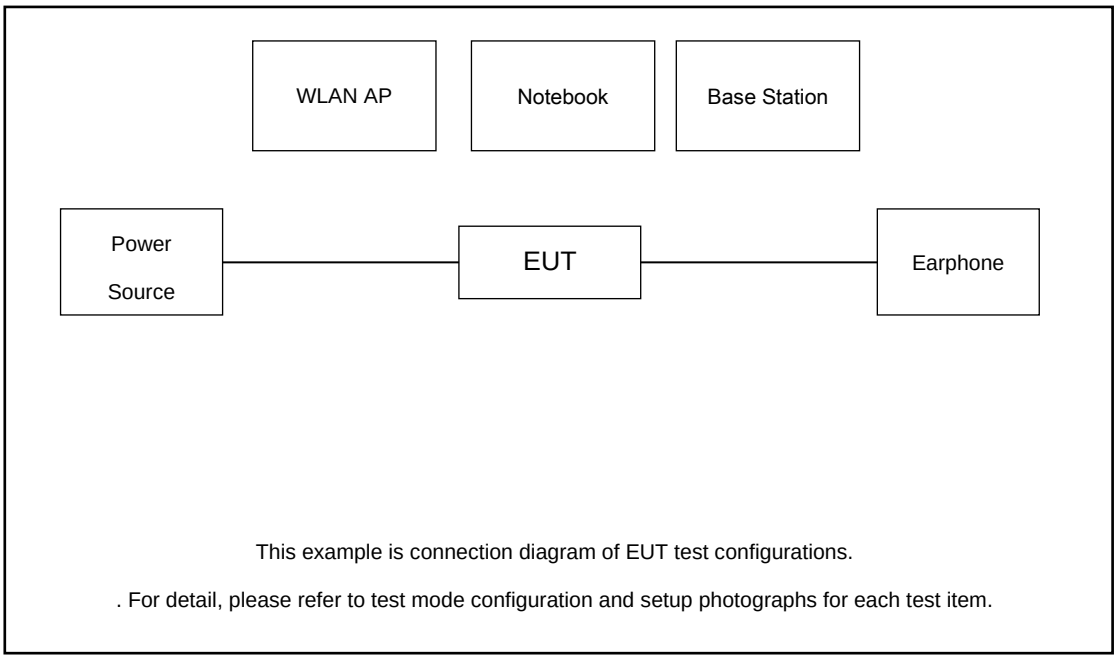
Ch. #		U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
		802.11ac VHT20	802.11ac VHT20	802.11ac VHT20	802.11ac VHT20
L	Low	36	52	100	149
M	Middle	44	60	116	157
H	High	48	64	140	165
Straddle		-	-	144	-

Ch. #		U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
		802.11ac VHT40	802.11ac VHT40	802.11ac VHT40	802.11ac VHT40
L	Low	38	54	102	151
M	Middle	-	-	110	-
H	High	46	62	134	159
Straddle		-	-	142	-

Ch. #		U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
		802.11ac VHT80	802.11ac VHT80	802.11ac VHT80	802.11ac VHT80
L	Low	-	-	106	-
M	Middle	42	58	-	155
H	High	-	-	-	-
Straddle		-	-	138	-

2.3 Connection Diagram of Test System

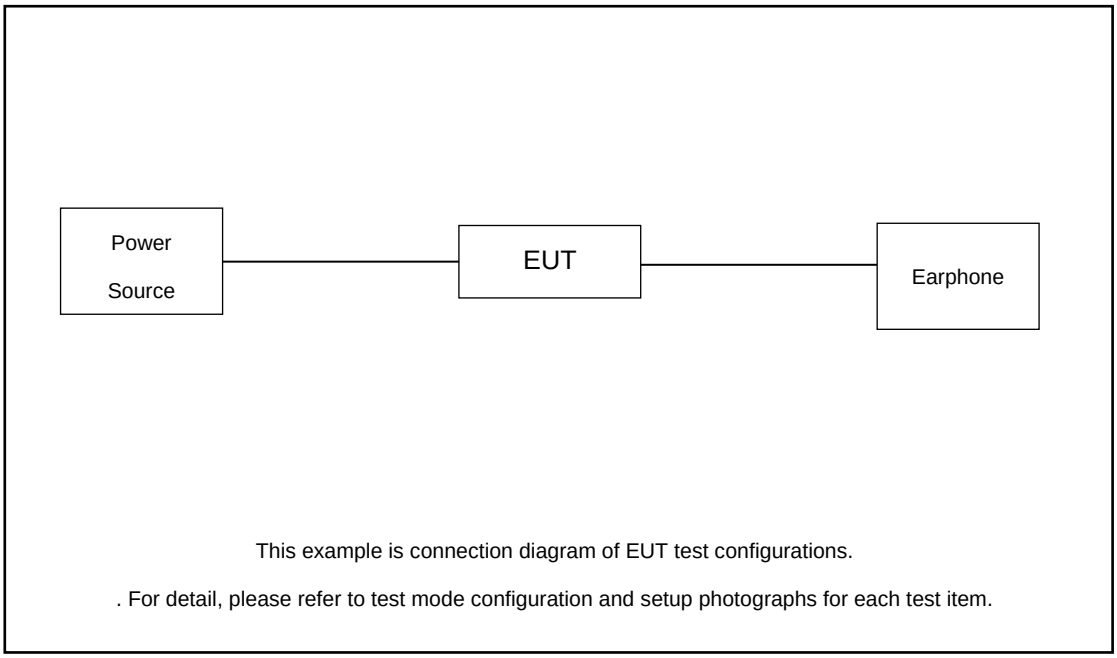
AC Conducted Emission:



This example is connection diagram of EUT test configurations.

. For detail, please refer to test mode configuration and setup photographs for each test item.

Radiated Emission:



This example is connection diagram of EUT test configurations.

. For detail, please refer to test mode configuration and setup photographs for each test item.

2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Base Station(LTE)	Anritsu	MT8820C	N/A	N/A	Unshielded,1.8m
2.	WLAN AP	Dlink	DIR-820L	KA2IR820LA1	N/A	Unshielded,1.8m
3.	Earphone	apple	N/A	DCAY1V-A900FZJW3-000	Shielded, 1.0m	N/A

2.5 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuously transmit/receive.

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 2.8 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 2.8 + 10 = 12.8 (dB)

3 Test Result

3.1 6dB and 26dB and 99% Occupied Bandwidth Measurement

3.1.1 Description of 6dB and 26dB and 99% Occupied Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

26dB and 99% Occupied bandwidth are reporting only.

3.1.2 Measuring Instruments

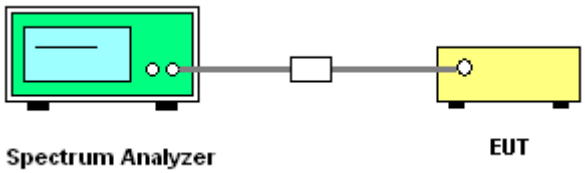
The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

☒	Section C) Bandwidth Measurement 1. Emission Bandwidth (EBW) and 99% OBW
	1. Set RBW = approximately 1% of the emission bandwidth. **2.** Set the VBW > RBW. **3.** Detector = Peak. **4.** Trace mode = max hold **5.** Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%. **6.** For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set to 1%~5% of the OBW and set the Video bandwidth (VBW) ≥ 3 * RBW. **7.** Measure and record the results in the test report.
☒	Section C) Bandwidth Measurement 2. Minimum Emission Bandwidth for the band 5.725 - 5.85 GHz
	1. Set RBW = 100kHz. **2.** Set the VBW ≥ 3 x RBW. **3.** Detector = Peak. **4.** Trace mode = max hold **5.** Measure the maximum width of the emission that is 6 dB down from the peak of the emission. **6.** Measure and record the results in the test report.

3.1.4 Test Setup



3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.

3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

<FCC 14-30 CFR 15.407>

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW.

For the 5.25–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz.

For the band 5.725–5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

For the 5.47–5.6 GHz and 5.65–5.725 GHz band, the maximum conducted output power shall not exceed 250 mW or 11 + 10 log10 B, dBm, whichever power is less. The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz.

For Straddle Channel, According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, If the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Note that U-NII-2 band, devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

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3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

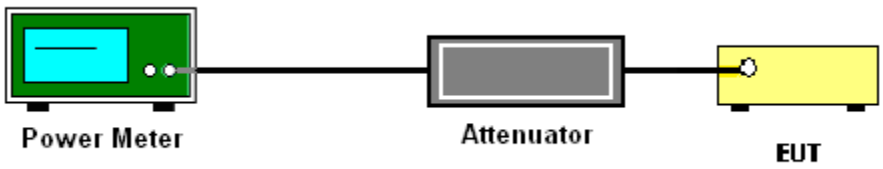
The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

Method PM (Measurement using an RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
3. Measure the average power of the transmitter, and the average power is corrected with duty factor, 10 log(1/x), where x is the duty cycle.

For Straddle Channel, According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, If the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum power spectral density shall not exceed 11dBm in any 1 megahertz band.

For the 5.25–5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

For the band 5.725–5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.

For Straddle Channel, According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, If the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

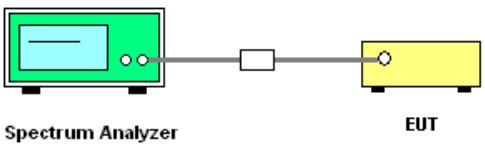
3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r04.
Section F) Maximum power spectral density.

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

3.4 Unwanted Emissions Measurement

This section as specified in FCC Part 15.407(b) is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement. The unwanted emissions shall comply with 15.407(b)(1) to (6), and restricted bands per FCC Part15.205.

3.4.1 Limit of Unwanted Emissions

(1) For transmitters operating in the 5150-5250 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of –27dBm/MHz.

For transmitters operating in the 5250-5350 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band must meet all applicable technical requirements for operation in the 5150-5250 MHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5150-5250 MHz band.

For transmitters operating in the 5470-5600 MHz and 5650-5725MHz band: all emissions outside of the 5470-5600 MHz and 5650-5725MHz band shall not exceed an EIRP of -27 dBm/MHz.

(2) For transmitters operating in the 5.725-5.85 GHz band:
15.407(b)(4)(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

(3) Unwanted spurious emissions fallen in restricted bands shall comply with the general field strength limits as below table,

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

(4) EIRP (dBm)	Field Strength at 3m (dBμV/m)
- 27	68.3

Note: The following formula is used to convert the EIRP to field strength.

$$EIRP = E_{Meas} + 20\log(d_{Meas}) - 104.7$$

where

EIRP is the equivalent isotropically radiated power, in dBm

E_{Meas} is the field strength of the emission at the measurement distance, in dBμV/m

d_{Meas} is the measurement distance, in m

(4) ANSI C63.10-2013 clause 12.7.3 note 97

As specified by regulatory requirements, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit. However, an out-of-band emission that complies with both the average and peak general regulatory limits is not required to satisfy the peak emission limit.

3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r04. Section G) Unwanted emissions measurement.

   (1) Procedure for Unwanted Emissions Measurements Below 1000MHz

   - RBW = 120 kHz
   - VBW = 300 kHz
   - Detector = Peak
   - Trace mode = max hold

   (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz

   - RBW = 1 MHz
   - VBW ≥ 3 MHz
   - Detector = Peak
   - Sweep time = auto
   - Trace mode = max hold

   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

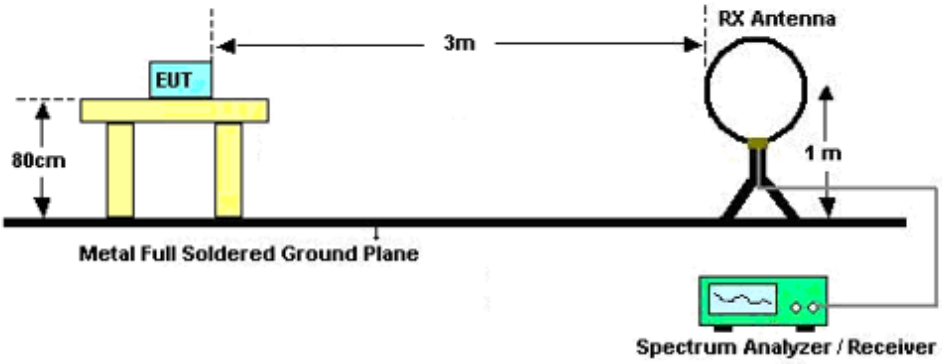
   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.

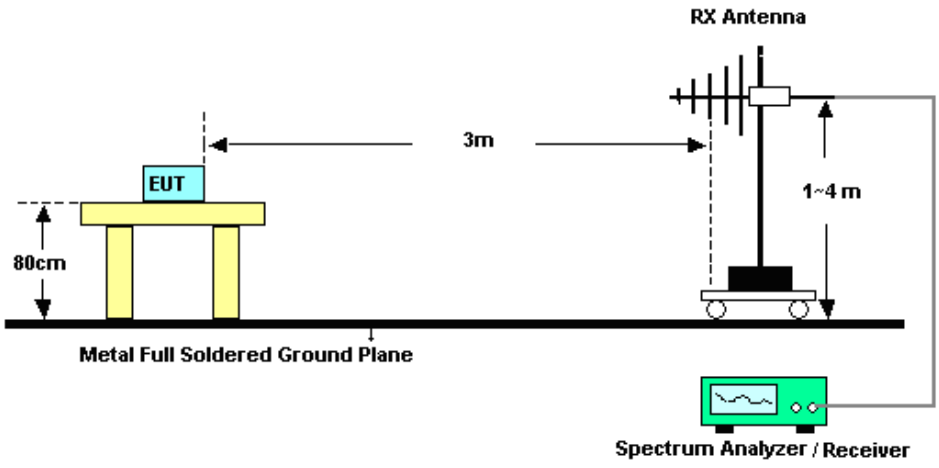
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.4.4 Test Setup

For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



3.4.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

3.4.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C.

3.4.7 Duty Cycle

Please refer to Appendix D.

3.4.8 Test Result of Radiated Spurious Emissions (30MHz ~ 10th Harmonic)

Please refer to Appendix C.

3.5 AC Conducted Emission Measurement

3.5.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

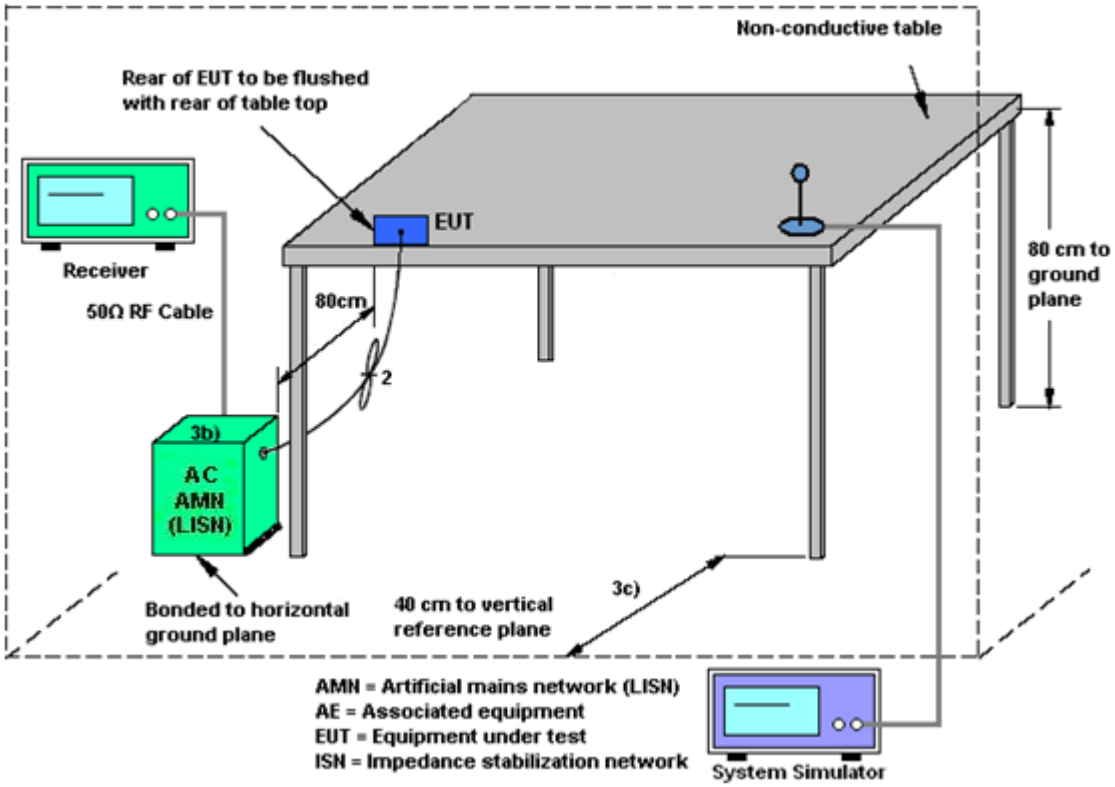
3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.5.4 Test Setup



3.5.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.6 Antenna Requirements

3.6.1 Standard Applicable

According to FCC 47 CFR Section 15.407(a)(1)(2) ,if transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.6.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.6.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr. 06, 2023	Jun. 12, 2023 ~Jun. 26, 2023	Apr. 05, 2024	Conducted (TH01-SZ)
Pulse Power Senor	Anritsu	MA2411B	1339473	30MHz~40GHz	Dec. 27, 2022	Jun. 12, 2023 ~Jun. 26, 2023	Dec. 26, 2023	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1542004	50MHz Bandwidth	Dec. 27, 2022	Jun. 12, 2023 ~Jun. 26, 2023	Dec. 26, 2023	Conducted (TH01-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Jul. 07, 2023	Jun. 12, 2023 ~Jul. 07, 2023	Jul. 06, 2024	Radiation (03CH02-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	Jul. 28, 2022	Jun. 12, 2023 ~Jul. 07, 2023	Jul. 27, 2024	Radiation (03CH02-SZ)
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz-2GHz	Sep. 28, 2021	Jun. 12, 2023 ~Jul. 07, 2023	Sep. 27, 2023	Radiation (03CH02-SZ)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00119436	1GHz~18GHz	Jul. 07, 2022	Jun. 12, 2023 ~Jul. 07, 2023	Jul. 06, 2023	Radiation (03CH02-SZ)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00119436	1GHz~18GHz	Jul. 07, 2023		Jul. 06, 2024	Radiation (03CH02-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 07, 2022	Jun. 12, 2023 ~Jul. 07, 2023	Jul. 06, 2023	Radiation (03CH02-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 07, 2023		Jul. 06, 2024	Radiation (03CH02-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Apr. 08, 2023	Jun. 12, 2023 ~Jul. 07, 2023	Apr. 07, 2024	Radiation (03CH02-SZ)
LF Amplifier	Burgeon	BPA-530	102211	0.01~3000Mhz	Oct. 19, 2022	Jun. 12, 2023 ~Jul. 07, 2023	Oct. 18, 2023	Radiation (03CH02-SZ)
HF Amplifier	MITEQ	AMF-7D-00101800-30-10P-R	1943528	1GHz~18GHz	Oct. 19, 2022	Jun. 12, 2023 ~Jul. 07, 2023	Oct. 18, 2023	Radiation (03CH02-SZ)
HF Amplifier	KEYSIGHT	83017A	MY53270105	0.5GHz~26.5Ghz	Oct. 19, 2022	Jun. 12, 2023 ~Jul. 07, 2023	Oct. 18, 2023	Radiation (03CH02-SZ)
AC Power Source	Chroma	61601	616010003043	N/A	Nov. 10, 2022	Jun. 12, 2023 ~Jul. 07, 2023	Nov. 10, 2023	Radiation (03CH02-SZ)
Turn Table	Chaintek	T-200	N/A	0~360 degree	NCR	Jun. 12, 2023 ~Jul. 07, 2023	NCR	Radiation (03CH02-SZ)
Antenna Mast	Chaintek	MBS-400	N/A	1 m~4 m	NCR	Jun. 12, 2023 ~Jul. 07, 2023	NCR	Radiation (03CH02-SZ)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Jul. 07, 2022	Jun. 13, 2023	Jul. 06, 2023	Conduction (CO01-SZ)
AC LISN	R&S	ENV216	100063	9kHz~30MHz	Sep. 15, 2022	Jun.13, 2023	Sep. 14, 2023	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Oct. 17, 2022	Jun. 13, 2023	Oct. 16, 2023	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Jul. 07, 2022	Jun.13, 2023	Jul. 06, 2023	Conduction (CO01-SZ)

NCR: No Calibration Required

5 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.26dB**

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.0dB**

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.1dB**

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.1dB**

Appendix A. Conducted Test Results

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Chen Ran	Temperature:	21~25	°C
Test Date:	2023/6/12~2023/6/26	Relative Humidity:	51~54	%

TEST RESULTS DATA
Average Power Table

UNII-1										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)		Pass/Fail
11a	6Mbps	1	36	5180	0.11	17.79	23.98	-3.50		Pass
11a	6Mbps	1	44	5220	0.11	17.70	23.98	-3.50		Pass
11a	6Mbps	1	48	5240	0.11	17.68	23.98	-3.50		Pass
VHT20	MCS0	1	36	5180	0.12	17.84	23.98	-3.50		Pass
VHT20	MCS0	1	44	5220	0.12	17.80	23.98	-3.50		Pass
VHT20	MCS0	1	48	5240	0.12	17.78	23.98	-3.50		Pass
VHT40	MCS0	1	38	5190	0.23	16.32	23.98	-3.50		Pass
VHT40	MCS0	1	46	5230	0.23	16.29	23.98	-3.50		Pass
VHT80	MCS0	1	42	5210	0.48	14.84	23.98	-3.50		Pass

TEST RESULTS DATA
Average Power Table

UNII-2A										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)	EIRP Power Limit (dBm)	Pass/Fail
11a	6M bps	1	52	5260	0.11	17.81	23.98	-3.50	26.99	Pass
11a	6M bps	1	60	5300	0.11	18.32	23.98	-3.50	26.99	Pass
11a	6M bps	1	64	5320	0.11	18.41	23.98	-3.50	26.99	Pass
VHT20	MCS 0	1	52	5260	0.12	17.95	23.98	-3.50	26.99	Pass
VHT20	MCS 0	1	60	5300	0.12	18.39	23.98	-3.50	26.99	Pass
VHT20	MCS 0	1	64	5320	0.12	18.50	23.98	-3.50	26.99	Pass
VHT40	MCS 0	1	54	5270	0.23	16.31	23.98	-3.50	26.99	Pass
VHT40	MCS 0	1	62	5310	0.23	16.76	23.98	-3.50	26.99	Pass
VHT80	MCS 0	1	58	5290	0.48	15.30	23.98	-3.50	26.99	Pass

TEST RESULTS DATA
Average Power Table

UNII-2C										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)	EIRP Power Limit (dBm)	Pass/Fail
11a	6M bps	1	100	5500	0.11	18.23	23.98	-3.50	26.99	Pass
11a	6M bps	1	116	5580	0.11	18.38	23.98	-3.50	26.99	Pass
11a	6M bps	1	140	5700	0.11	18.29	23.98	-3.50	26.99	Pass
11a	6M bps	1	144	5720	0.11	18.25	23.98	-3.50	26.99	Pass
VHT20	MCS 0	1	100	5500	0.12	18.31	23.98	-3.50	26.99	Pass
VHT20	MCS 0	1	116	5580	0.12	18.42	23.98	-3.50	26.99	Pass
VHT20	MCS 0	1	140	5700	0.12	18.39	23.98	-3.50	26.99	Pass
VHT20	MCS 0	1	144	5720	0.12	18.33	23.98	-3.50	26.99	Pass
VHT40	MCS 0	1	102	5510	0.23	16.68	23.98	-3.50	26.99	Pass
VHT40	MCS 0	1	110	5550	0.23	16.89	23.98	-3.50	26.99	Pass
VHT40	MCS 0	1	134	5670	0.23	16.79	23.98	-3.50	26.99	Pass
VHT40	MCS 0	1	142	5710	0.23	16.64	23.98	-3.50	26.99	Pass
VHT80	MCS 0	1	106	5530	0.48	14.69	23.98	-3.50	26.99	Pass
VHT80	MCS 0	1	122	5610	0.48	16.75	23.98	-3.50	26.99	Pass
VHT80	MCS 0	1	138	5690	0.48	16.63	23.98	-3.50	26.99	Pass

TEST RESULTS DATA
Average Power Table

UNII-3										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)		Pass/Fail
11a	6M bps	1	149	5745	0.11	17.40	30.00	-4.50		Pass
11a	6Mbps	1	157	5785	0.11	17.27	30.00	-4.50		Pass
11a	6Mbps	1	165	5825	0.11	17.19	30.00	-4.50		Pass
VHT20	MCS 0	1	149	5745	0.12	17.43	30.00	-4.50		Pass
VHT20	MCS 0	1	157	5785	0.12	17.32	30.00	-4.50		Pass
VHT20	MCS 0	1	165	5825	0.12	17.23	30.00	-4.50		Pass
VHT40	MCS 0	1	151	5755	0.23	16.04	30.00	-4.50		Pass
VHT40	MCS 0	1	159	5795	0.23	15.50	30.00	-4.50		Pass
VHT80	MCS 0	1	155	5775	0.48	15.72	30.00	-4.50		Pass

Emission Bandwidth

Test Result

TestMode	Antenna	Freq(MHz)	26dB EBW [MHz]	FL[MHz]	FH[MHz]
11A	Ant6	5180	23.04	5168.24	5191.28
		5220	23.12	5208.24	5231.36
		5240	23.80	5227.72	5251.52
		5260	26.16	5247.04	5273.20
		5300	23.60	5288.28	5311.88
		5320	24.68	5307.08	5331.76
		5500	23.32	5488.16	5511.48
		5580	22.64	5568.68	5591.32
		5700	23.40	5688.12	5711.52
		5720	24.52	5707.40	5731.92
		5720_UNII-2C	17.6	5707.40	5725
		5720_UNII-3	6.92	5725	5731.92
		5745	23.28	5733.40	5756.68
		5785	23.76	5772.72	5796.48
		5825	23.84	5813.12	5836.96
11AC20SISO	Ant6	5180	24.24	5168.08	5192.32
		5220	25.08	5206.76	5231.84
		5240	24.60	5227.44	5252.04
		5260	24.76	5247.52	5272.28
		5300	24.52	5287.36	5311.88
		5320	25.08	5306.76	5331.84
		5500	24.72	5487.68	5512.40
		5580	23.96	5568.12	5592.08
		5700	25.00	5687.36	5712.36
		5720	24.08	5707.84	5731.92
		5720_UNII-2C	17.16	5707.84	5725
		5720_UNII-3	6.92	5725	5731.92
		5745	24.28	5732.84	5757.12
		5785	24.32	5772.60	5796.92
		5825	24.04	5812.76	5836.80
11AC40SISO	Ant6	5190	41.92	5169.04	5210.96
		5230	41.76	5209.12	5250.88

		5270	41.68	5249.12	5290.80
		5310	41.84	5289.04	5330.88
		5510	41.04	5489.52	5530.56
		5550	41.68	5529.12	5570.80
		5670	41.52	5649.12	5690.64
		5710	41.60	5689.28	5730.88
		5710_UNII-2C	35.72	5689.28	5725
		5710_UNII-3	5.88	5725	5730.88
		5755	42.00	5734.04	5776.04
		5795	41.44	5774.20	5815.64
11AC80SISO	Ant6	5210	84.32	5167.92	5252.24
		5290	83.68	5248.40	5332.08
		5530	83.20	5488.40	5571.60
		5610	84.48	5567.44	5651.92
		5690	84.64	5646.96	5731.60
		5690_UNII-2C	78.04	5646.96	5725
		5690_UNII-3	6.6	5725	5731.60
		5775	83.68	5733.24	5816.92

Test Graphs

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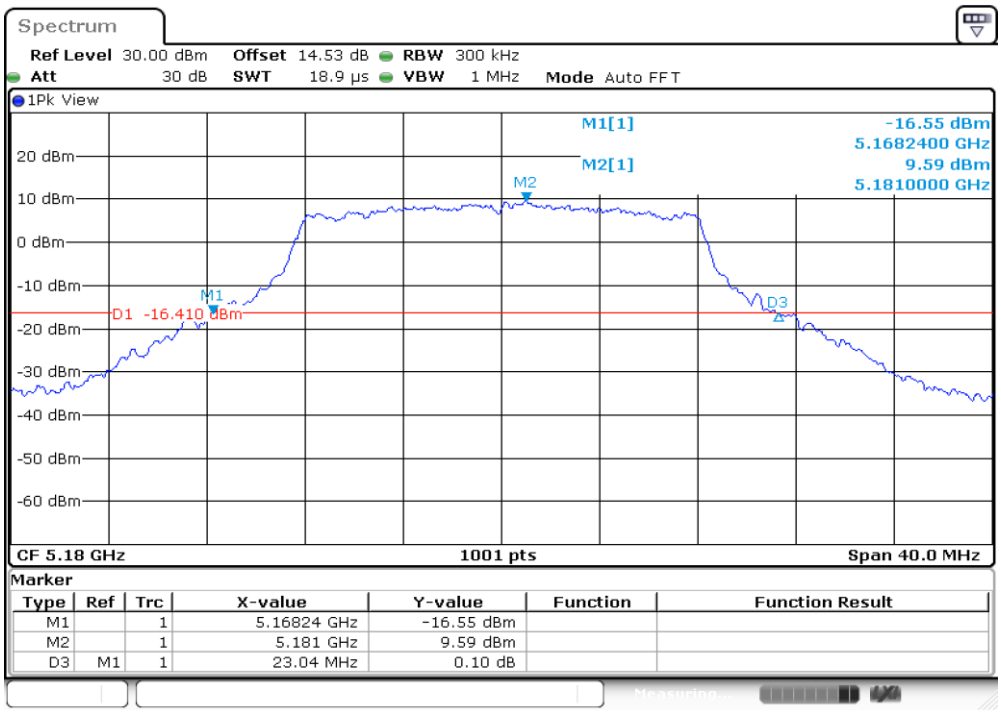

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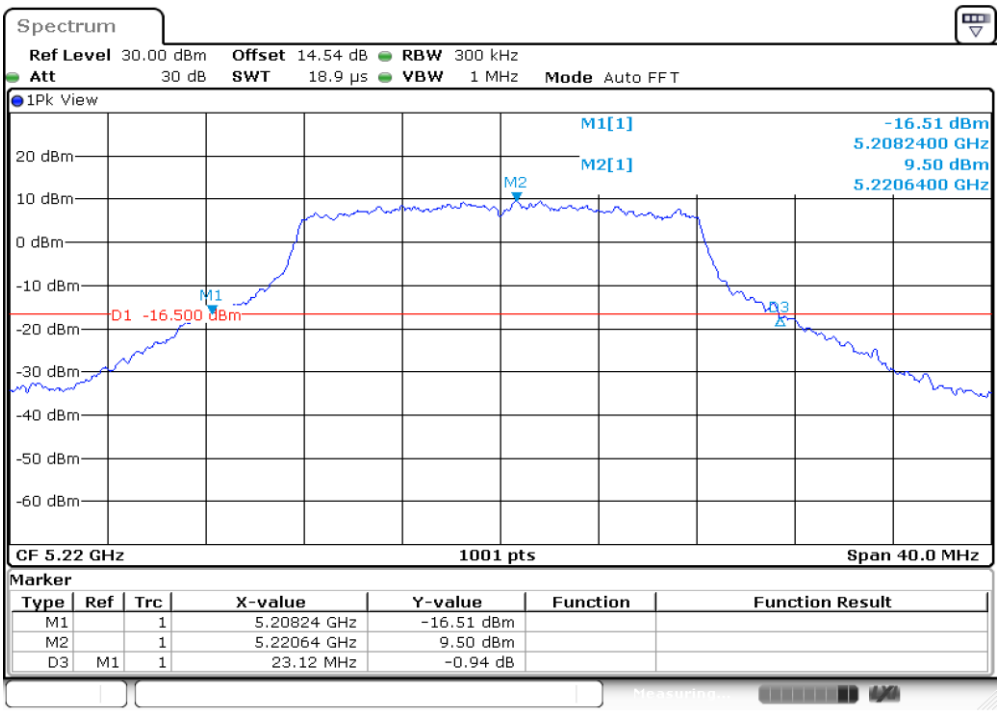

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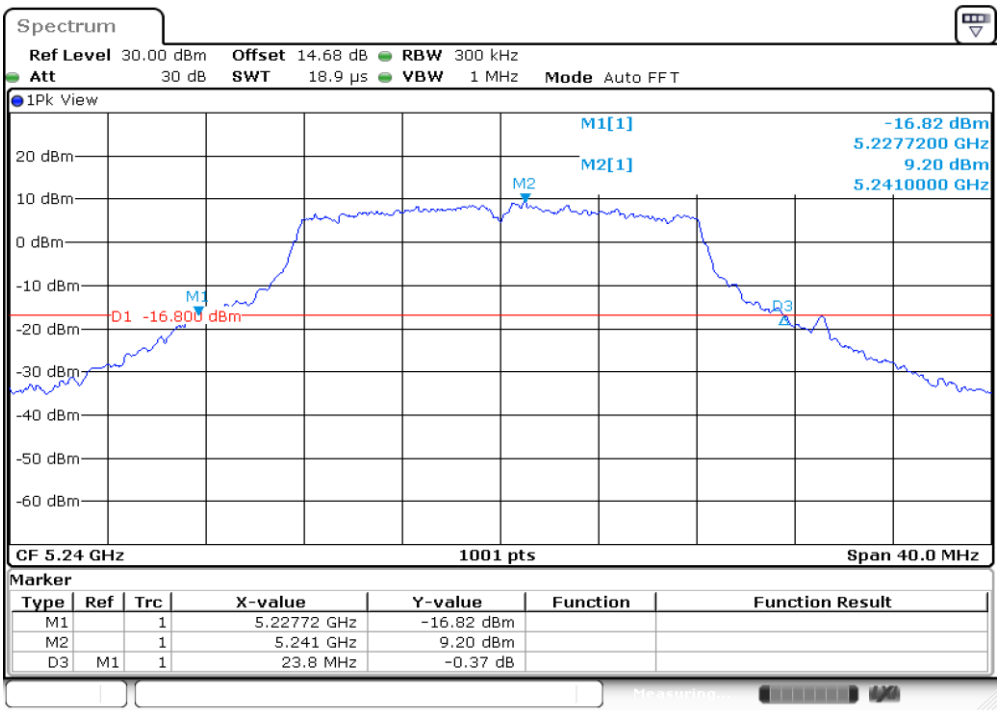

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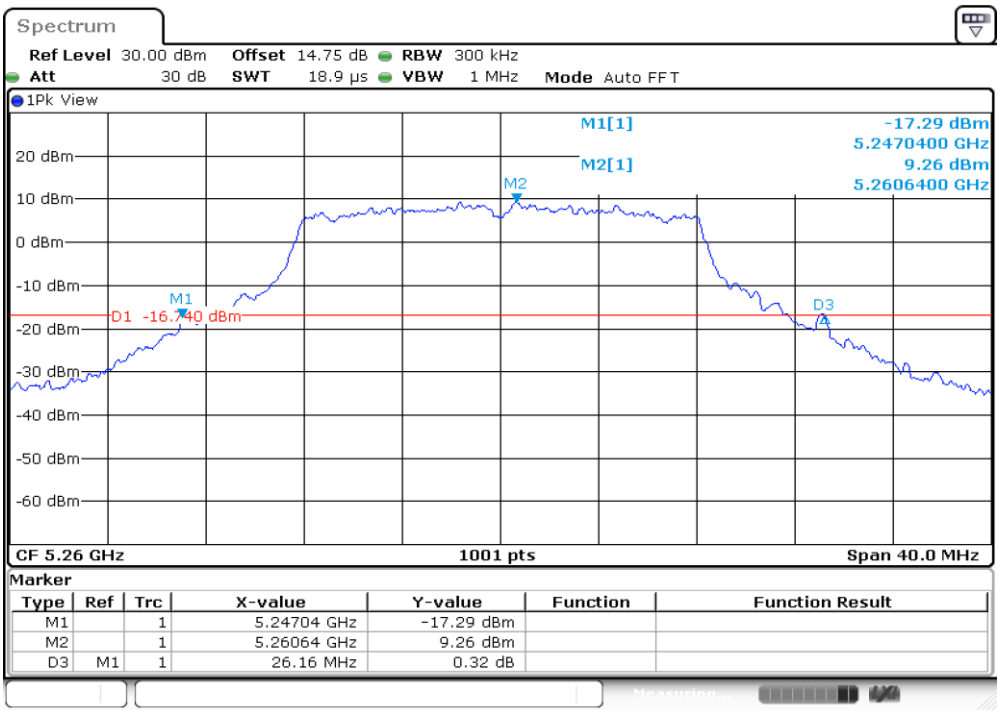

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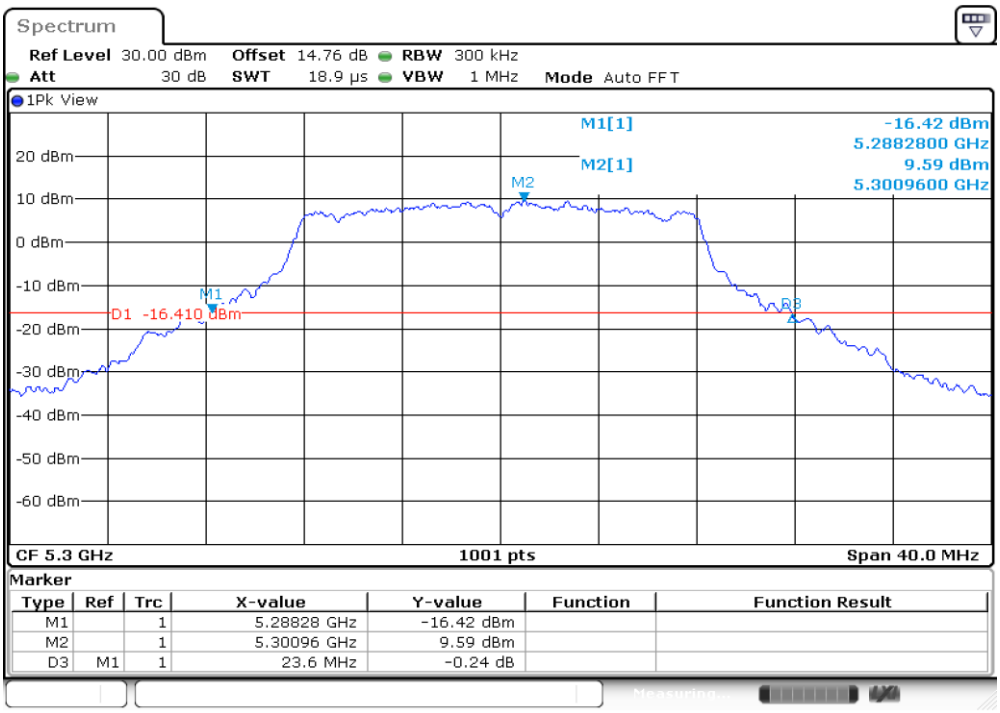

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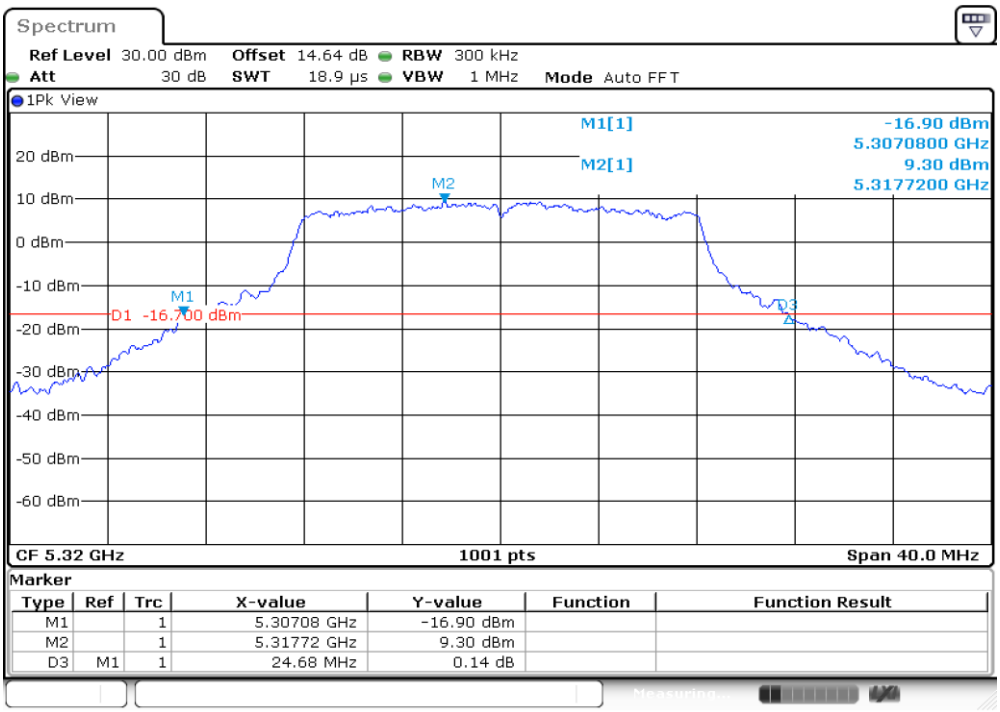

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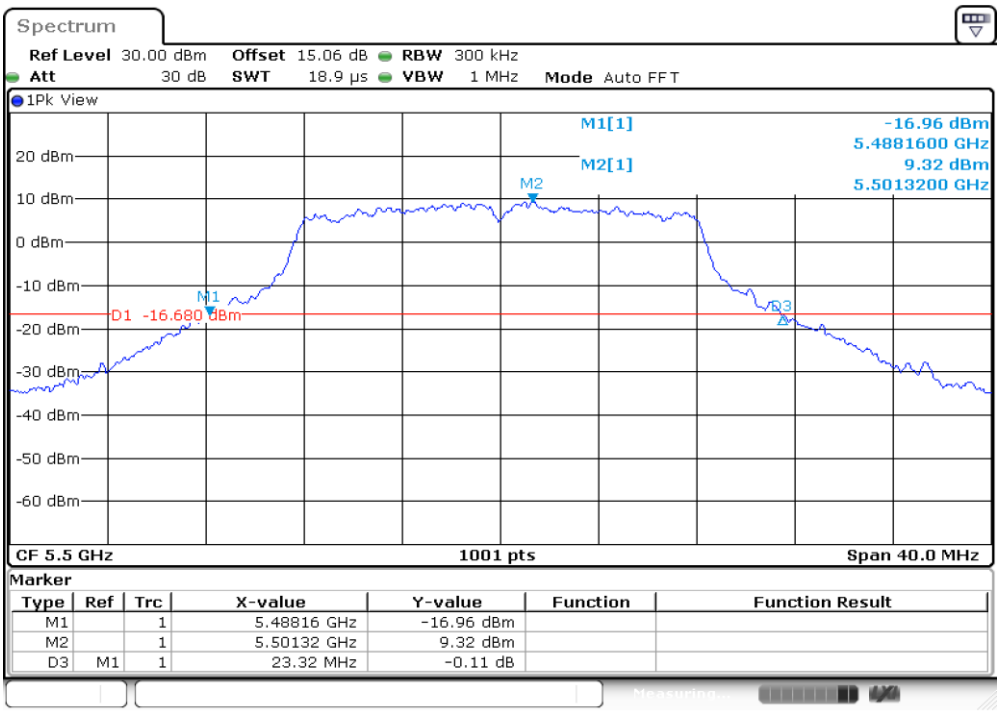

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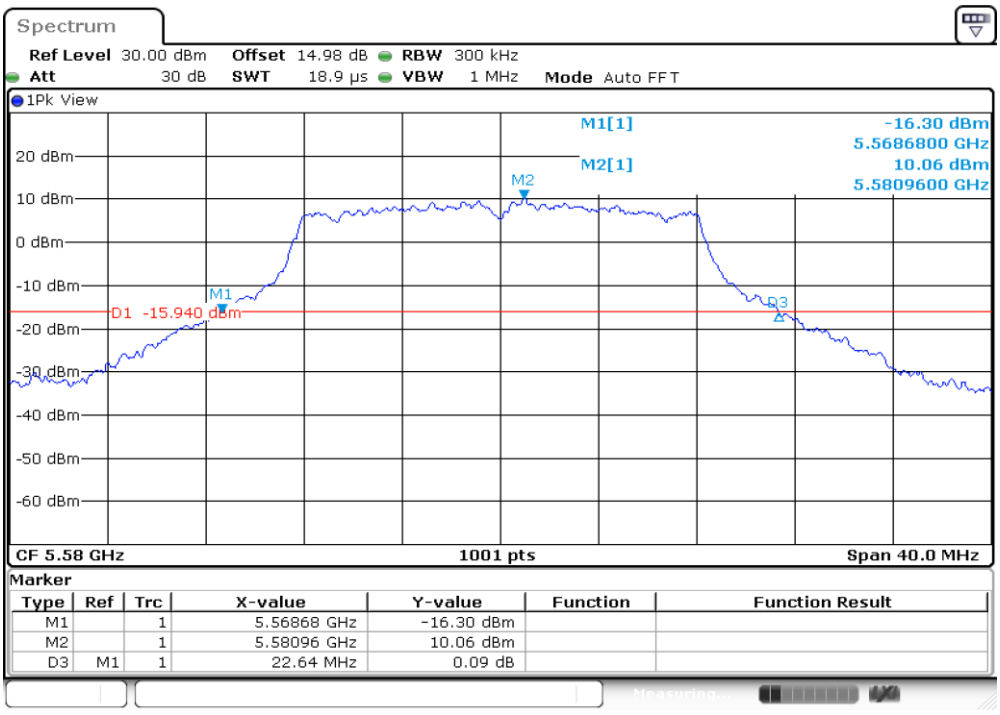

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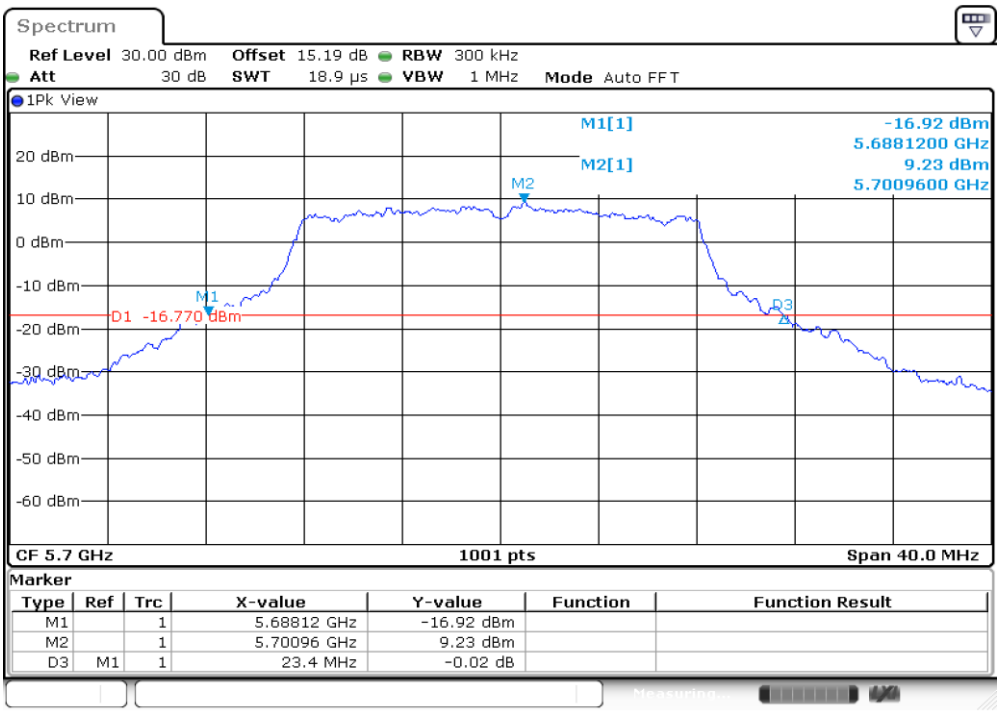

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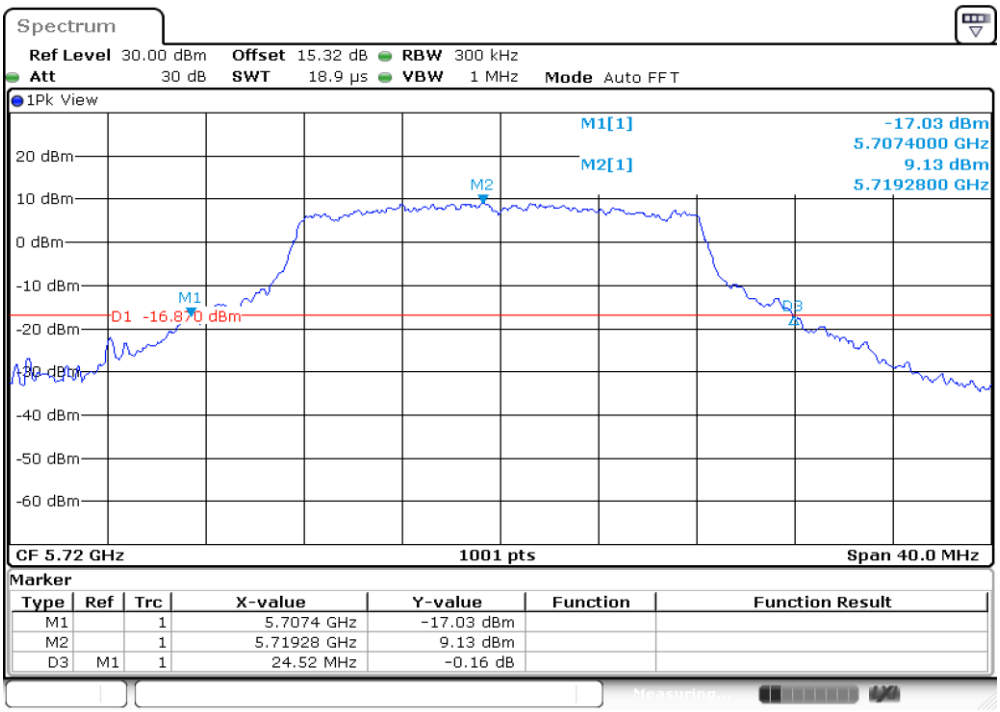

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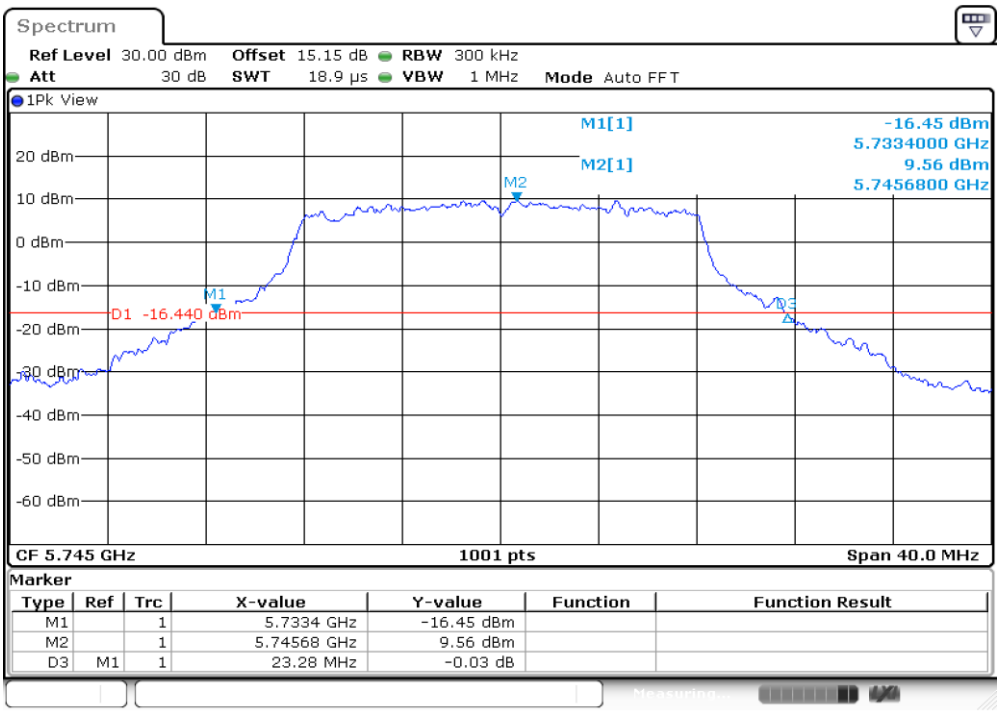

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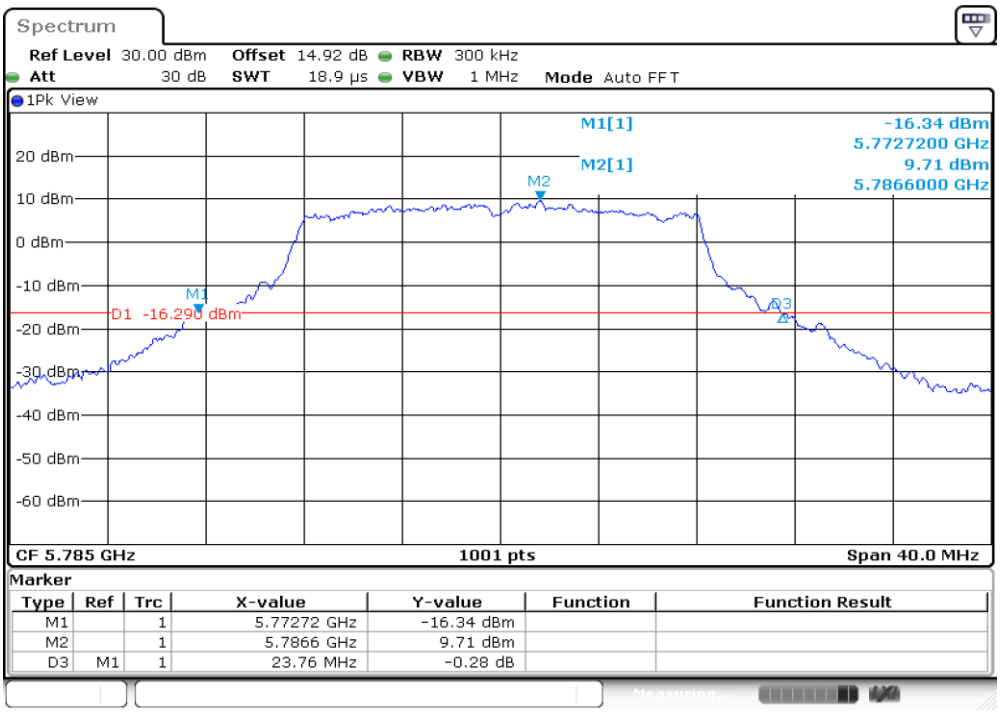

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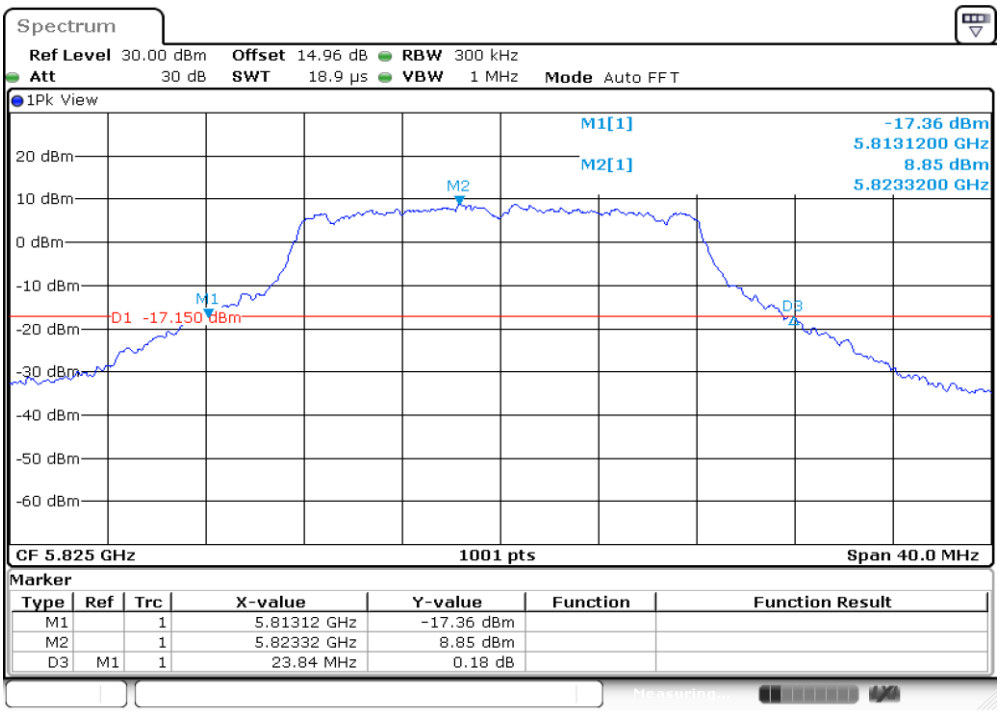

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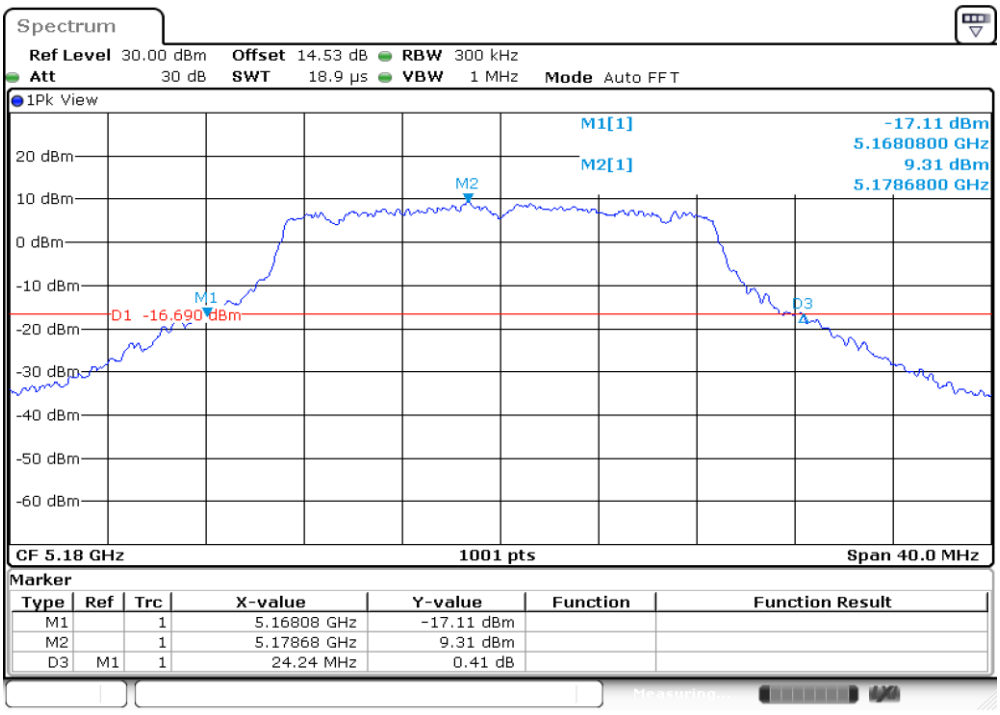

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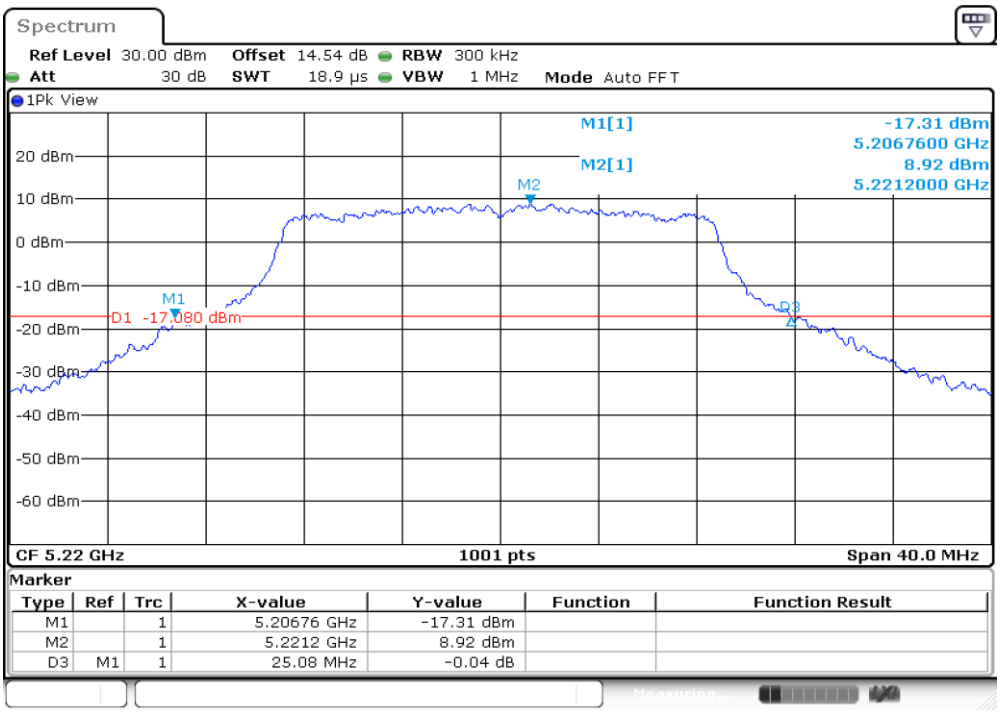
11AC20SISO_Ant6_5220



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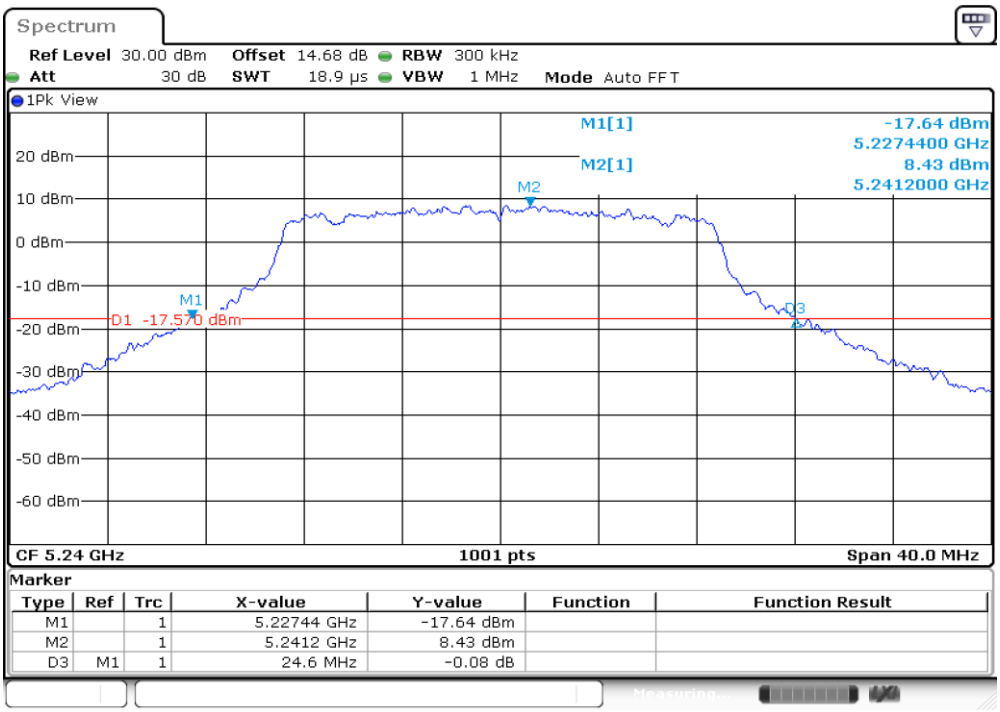

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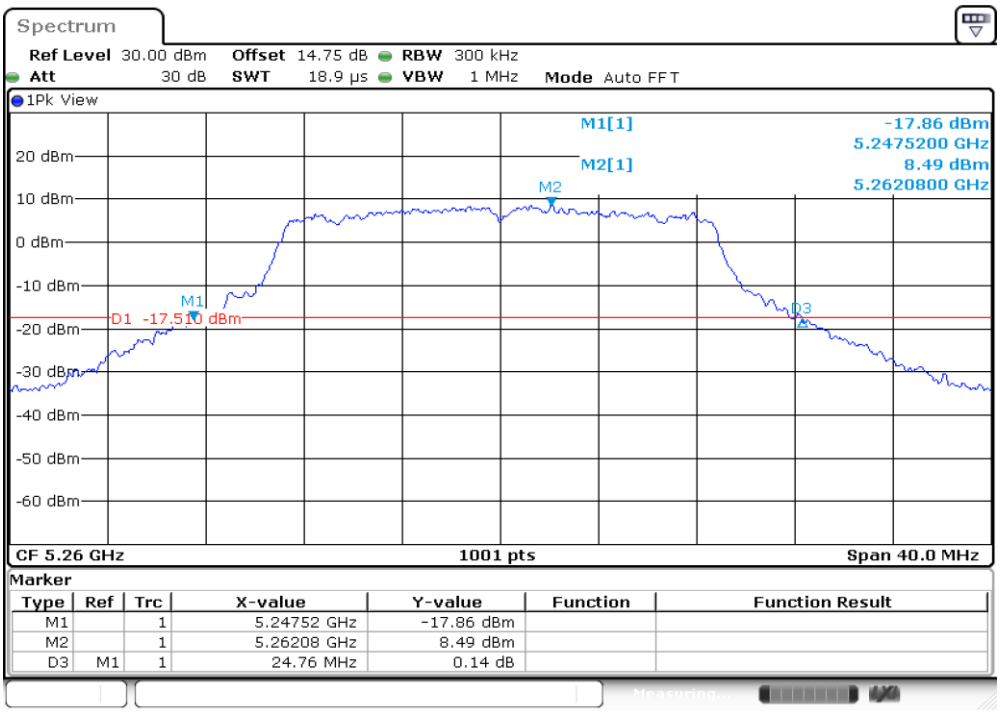

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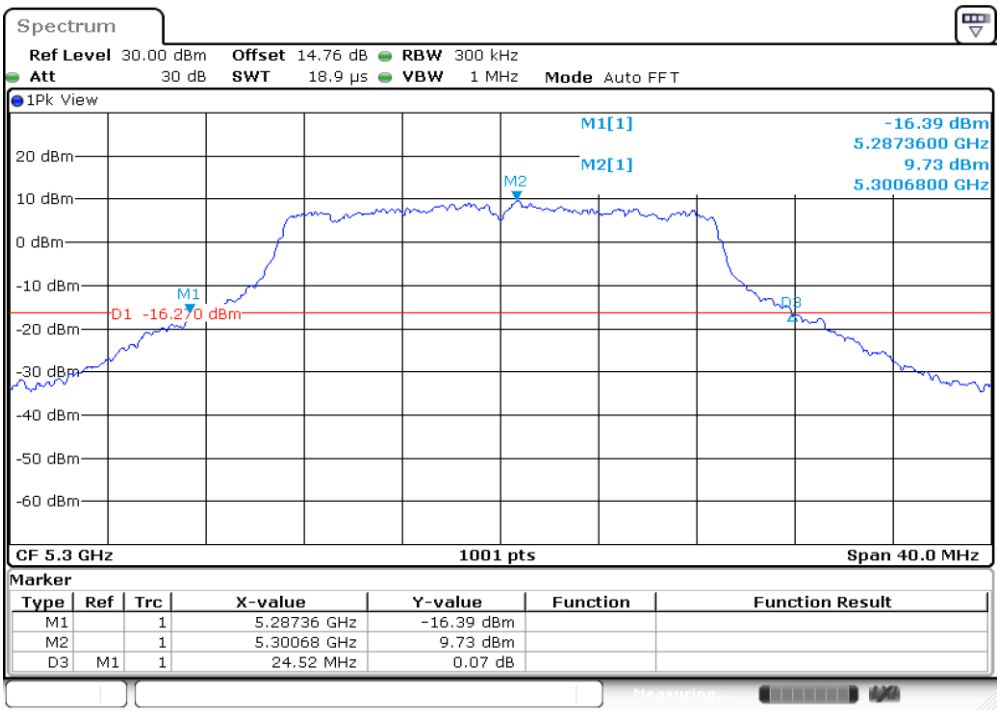

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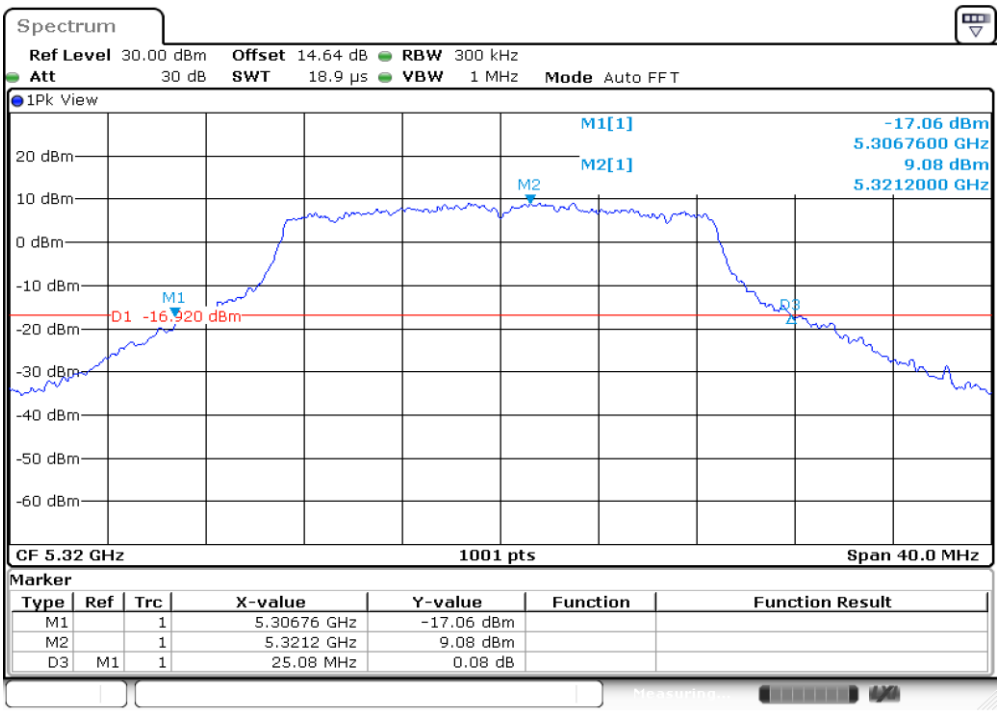

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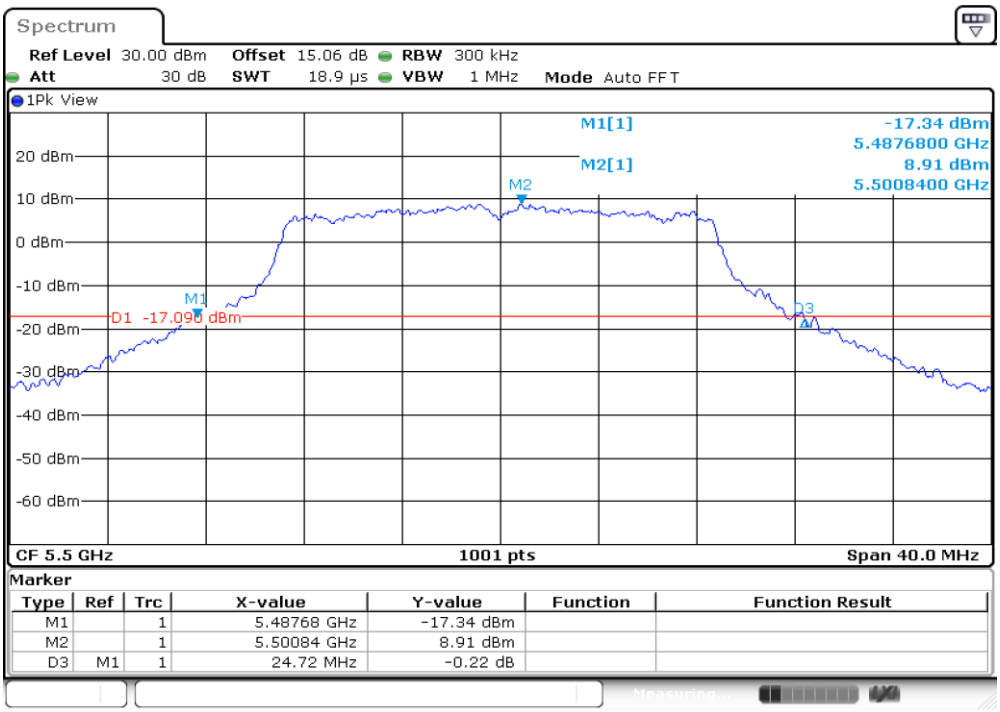

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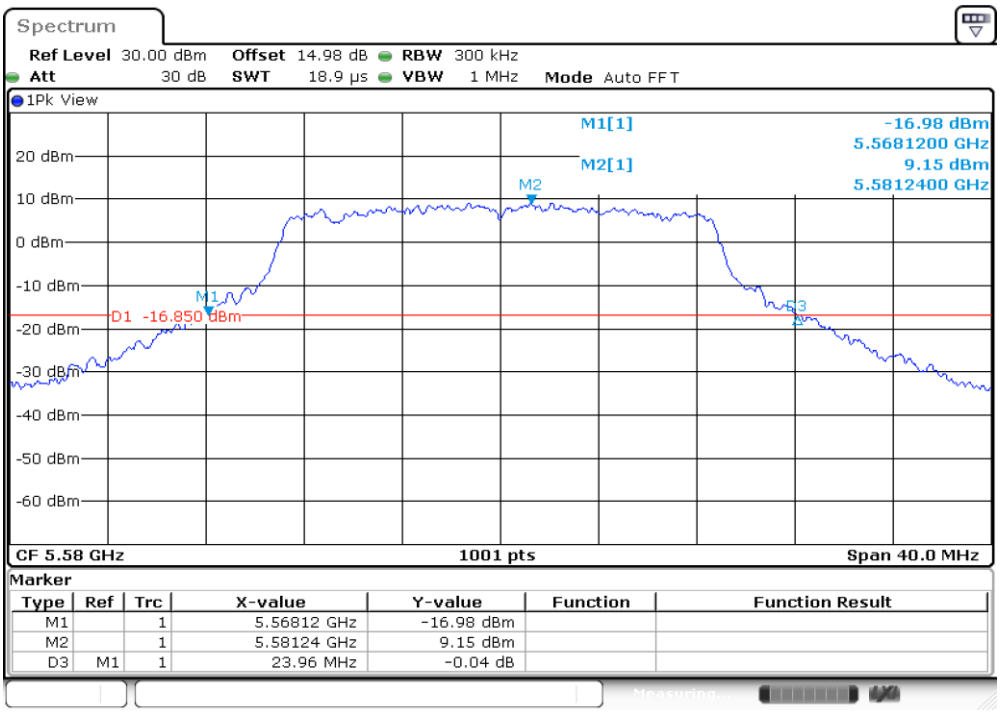

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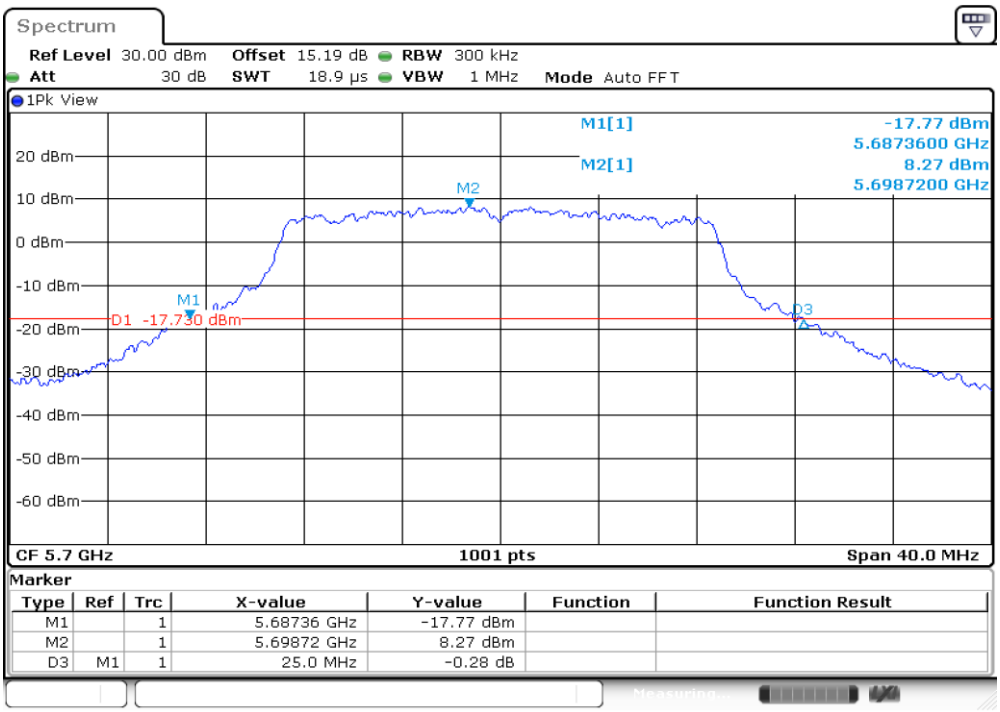

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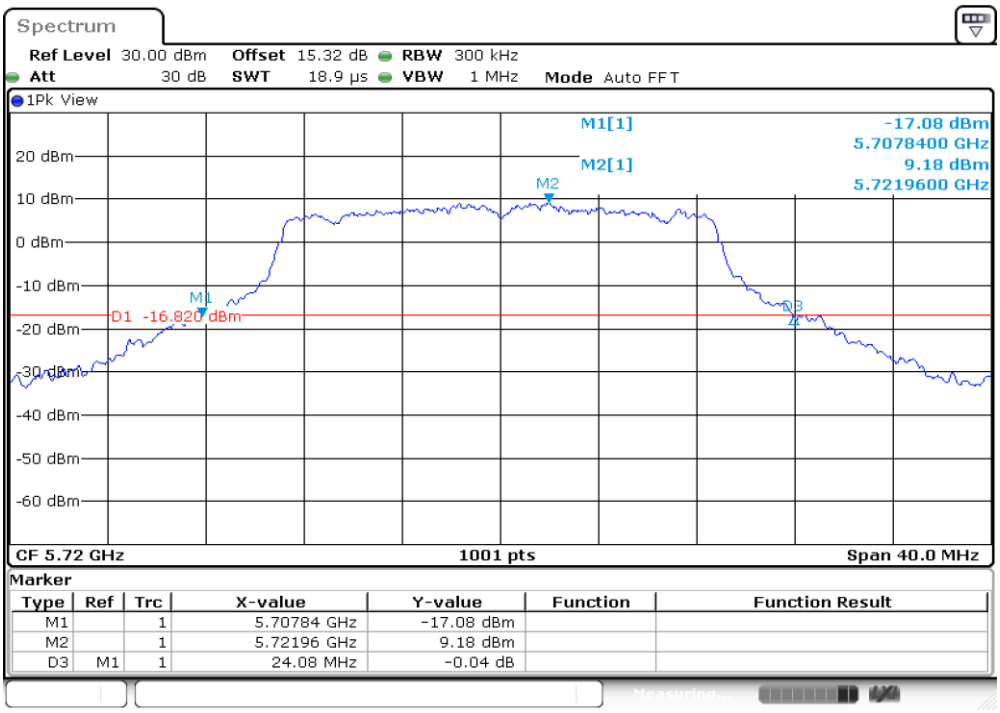

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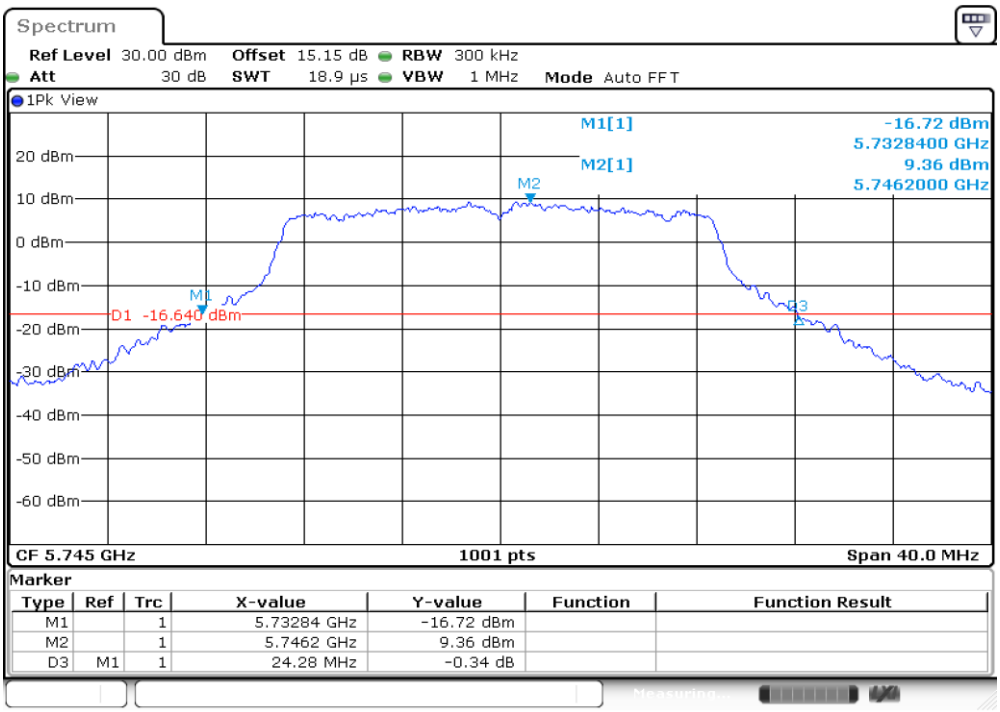

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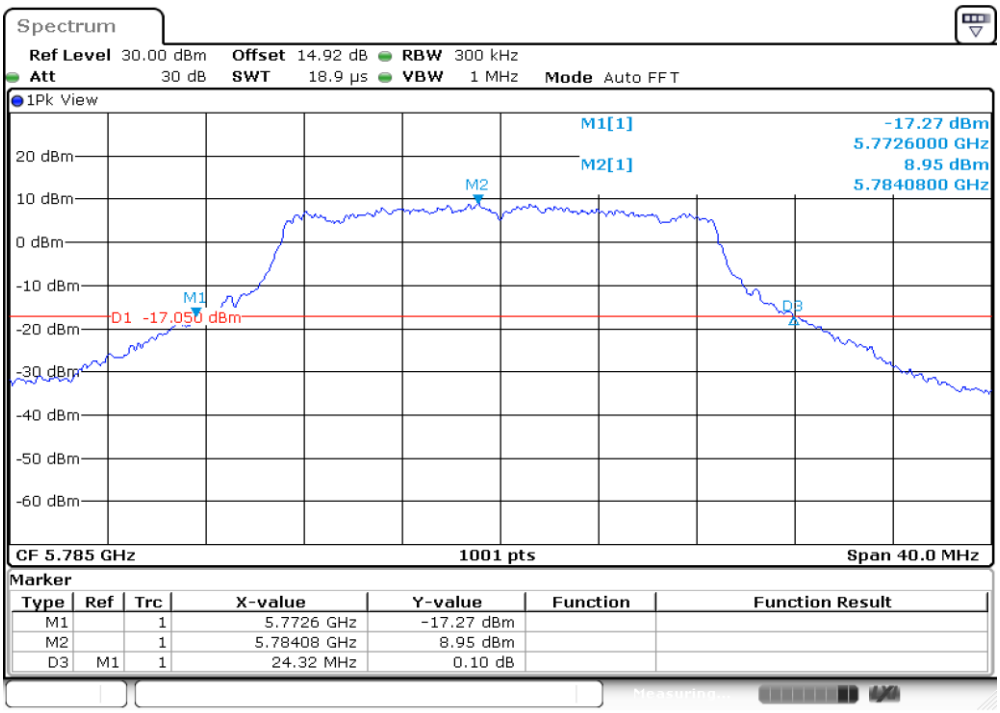

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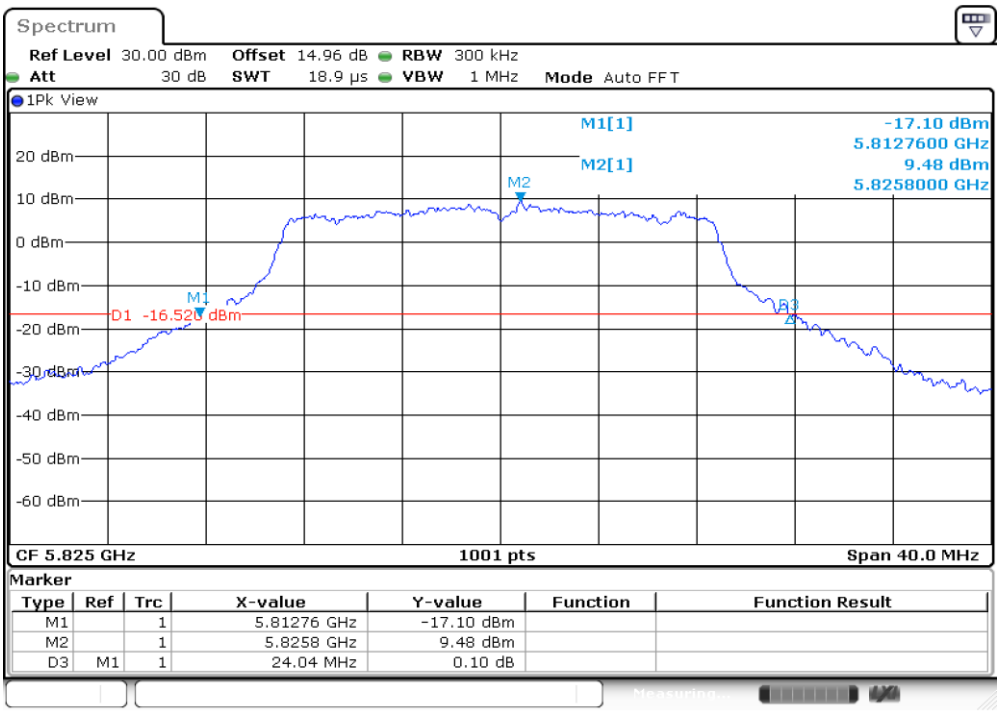
11AC20SISO_Ant6_5825



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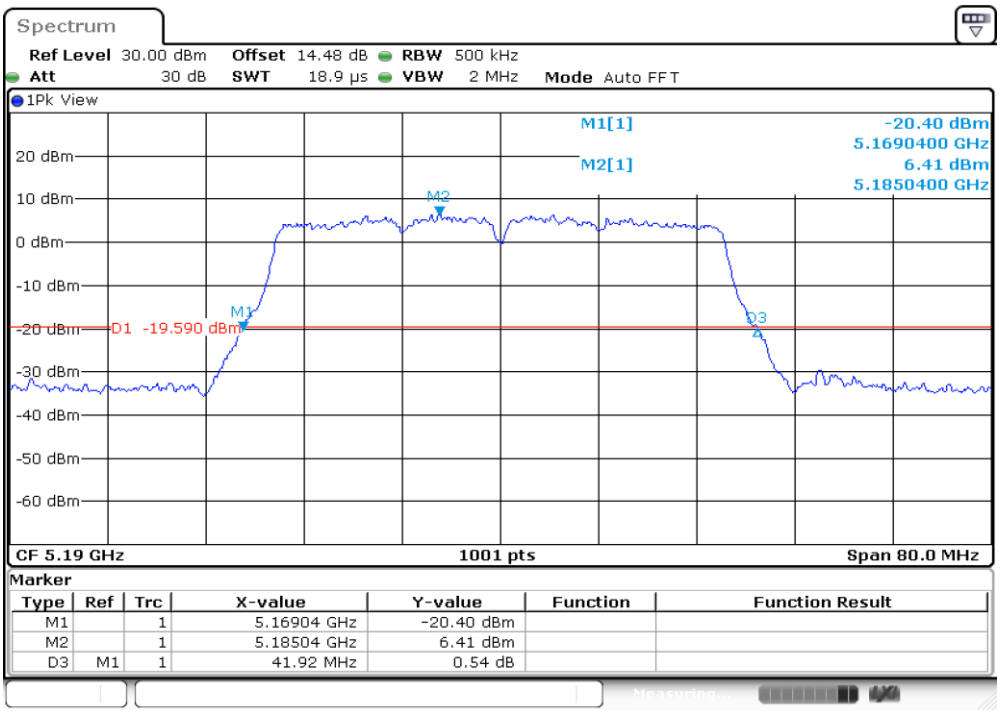

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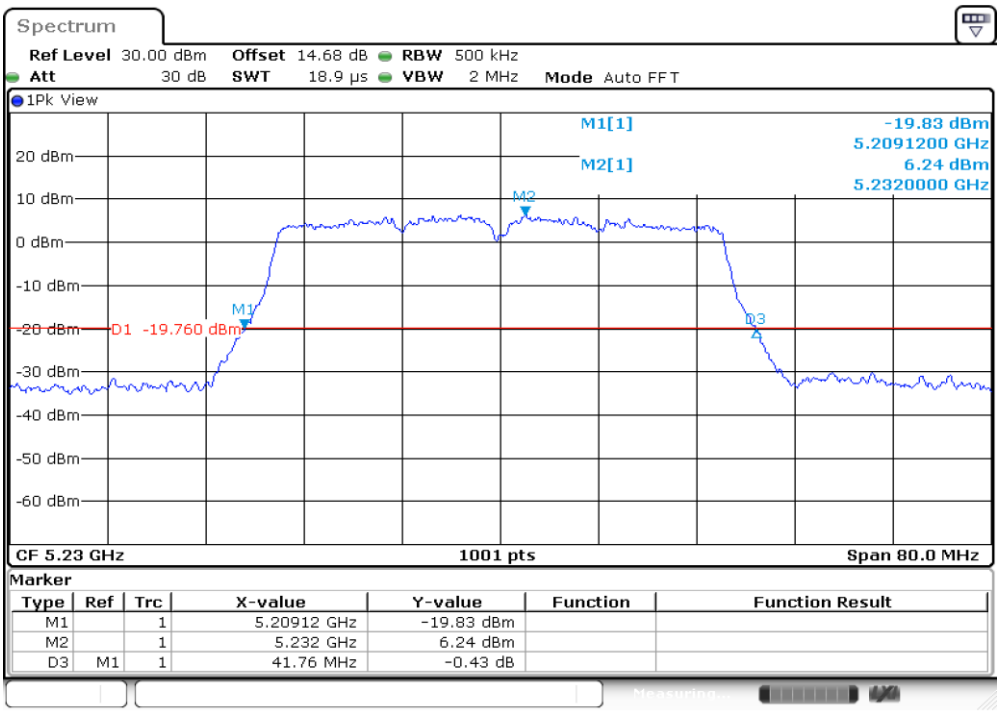

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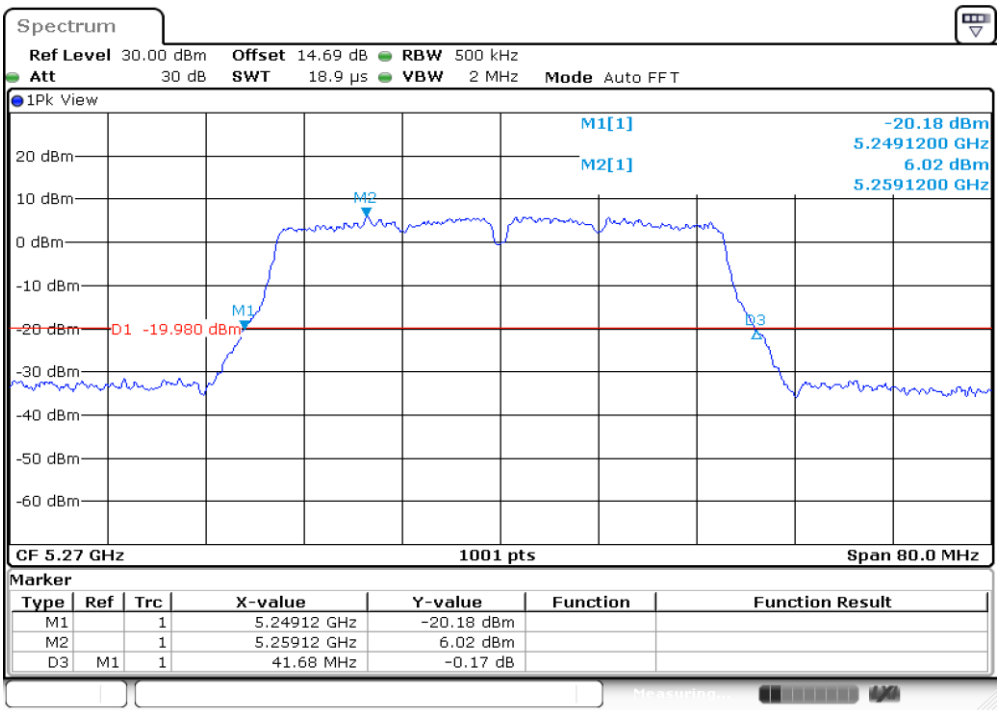

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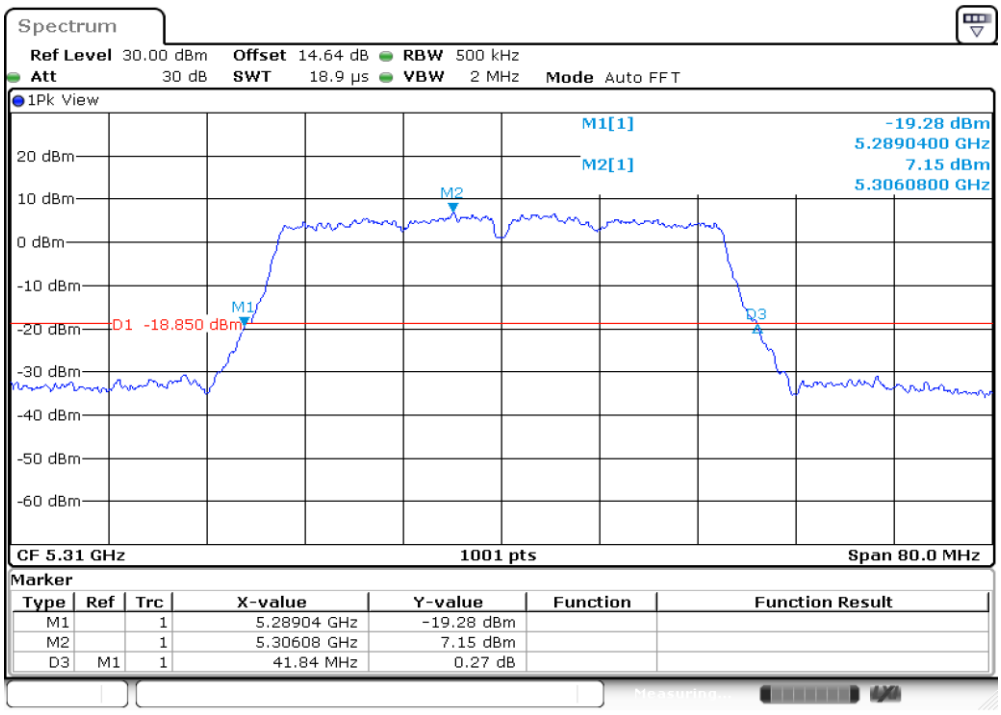

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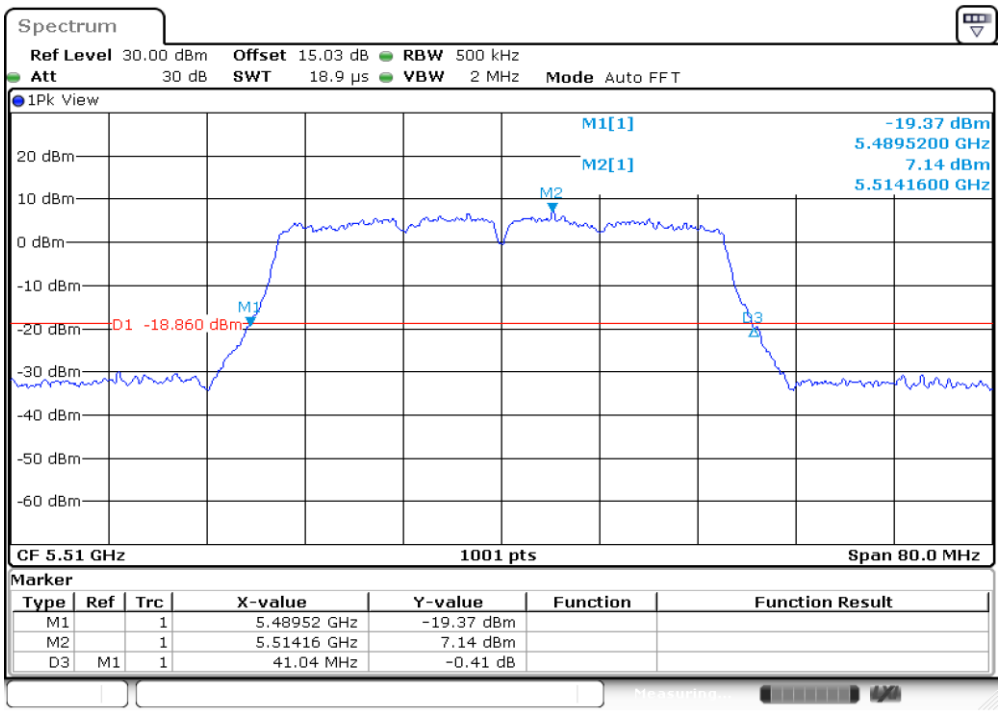

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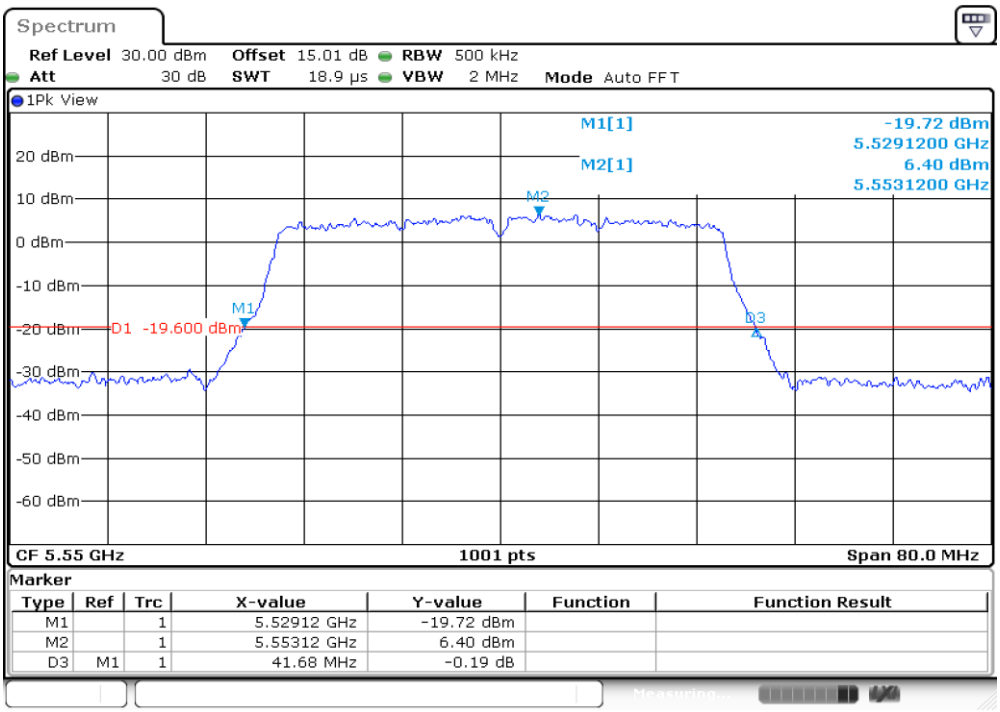

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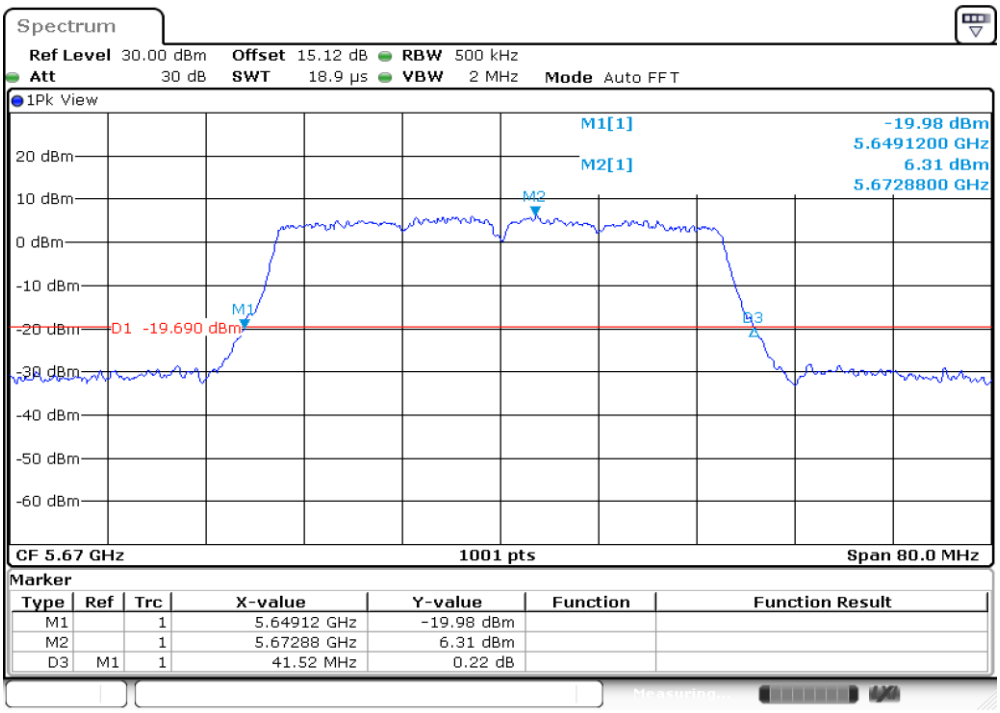

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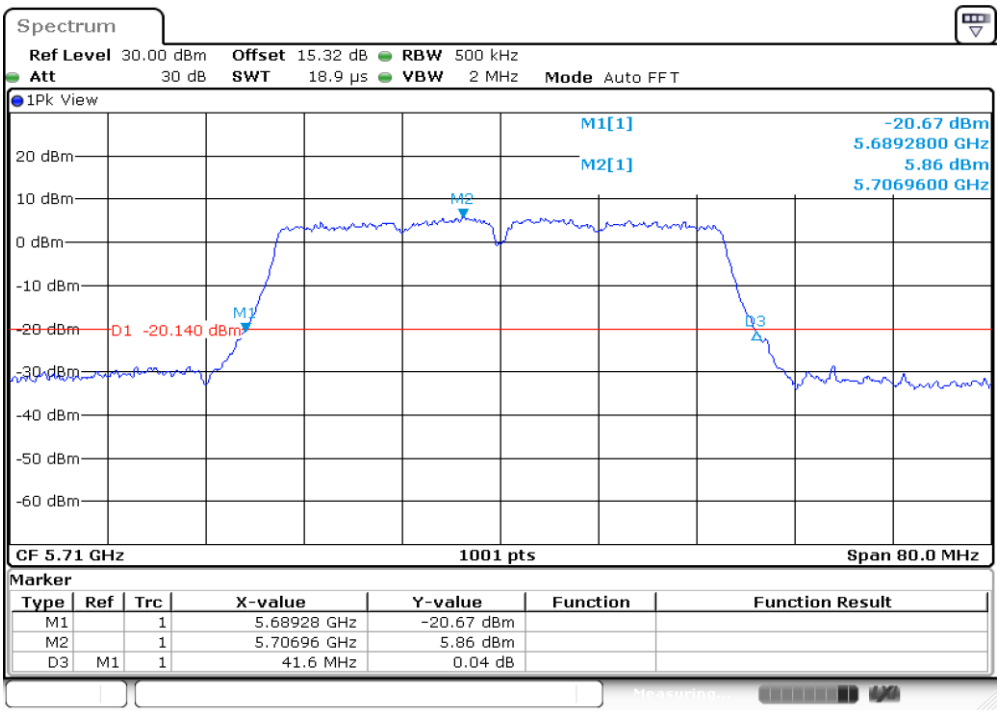

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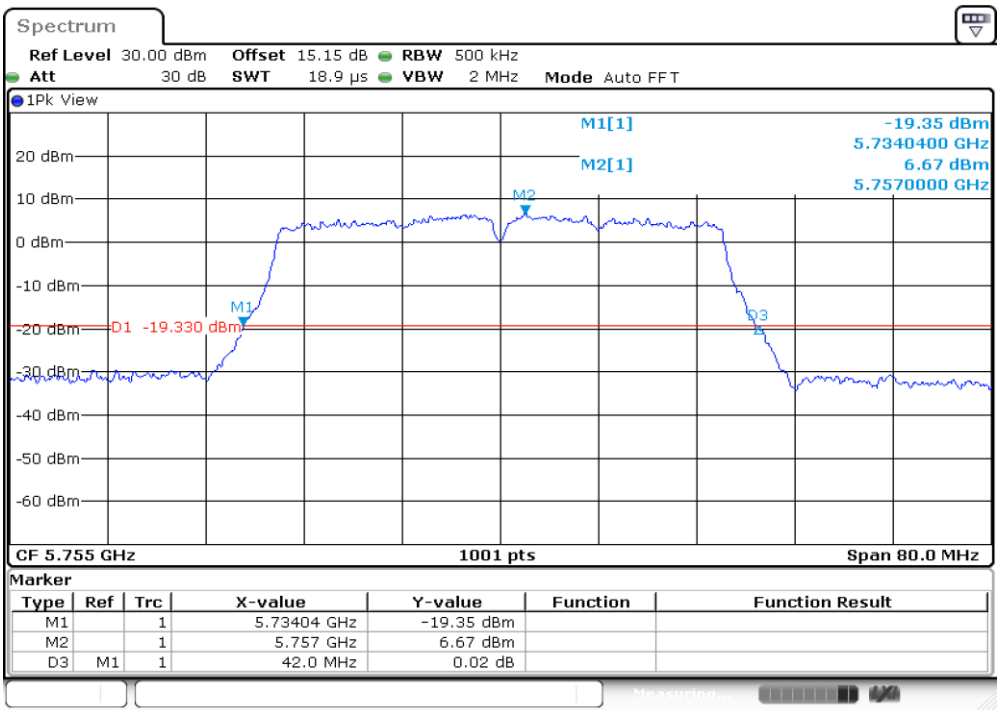

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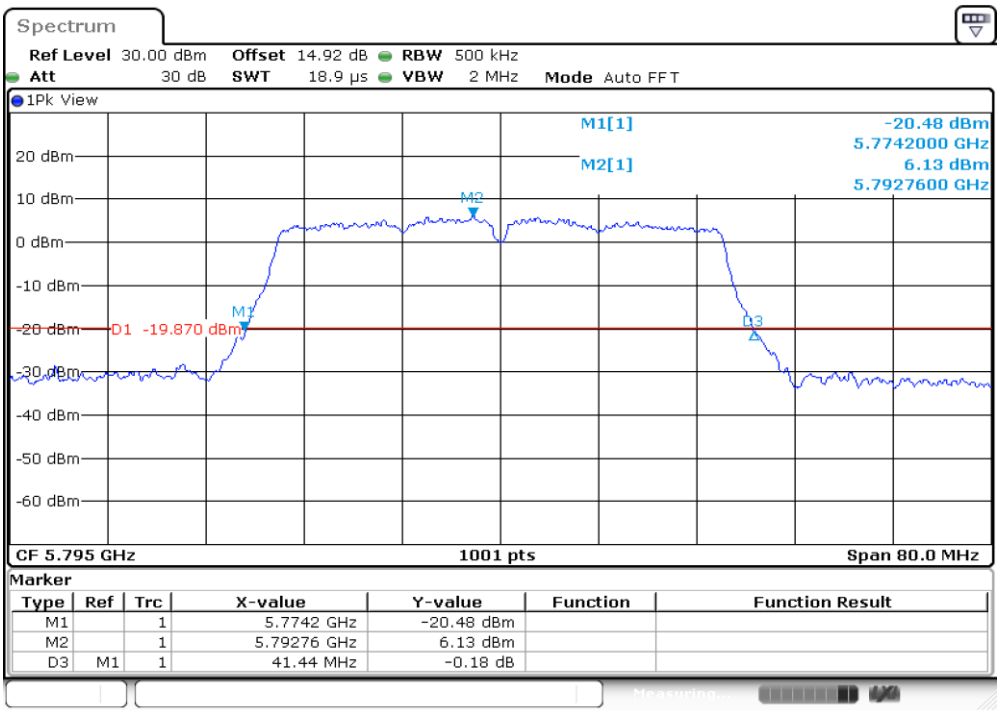

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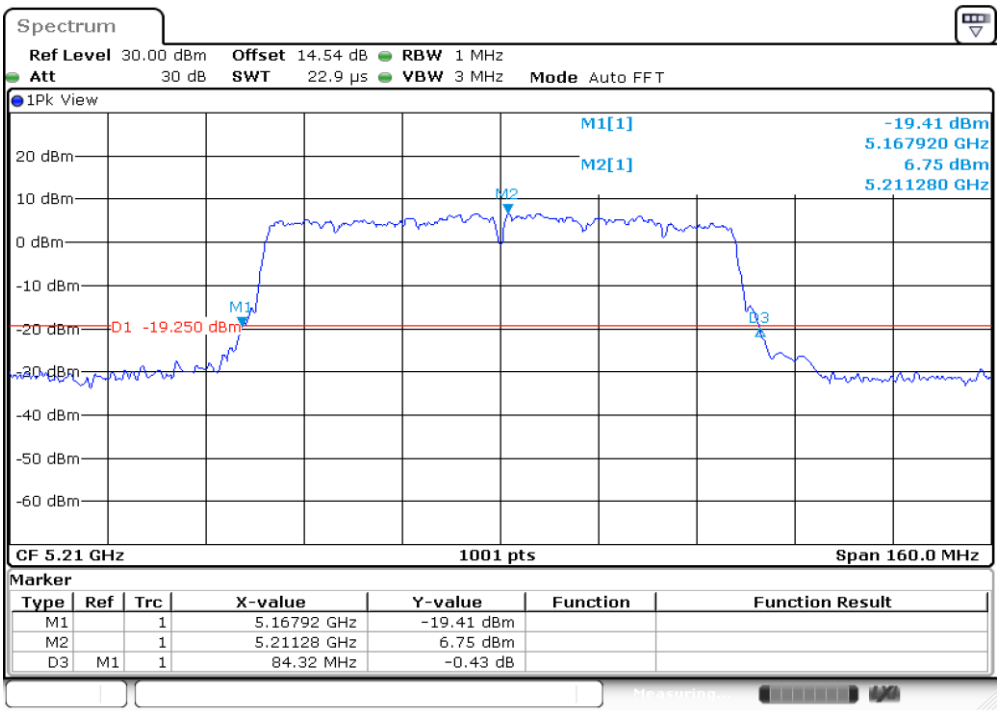

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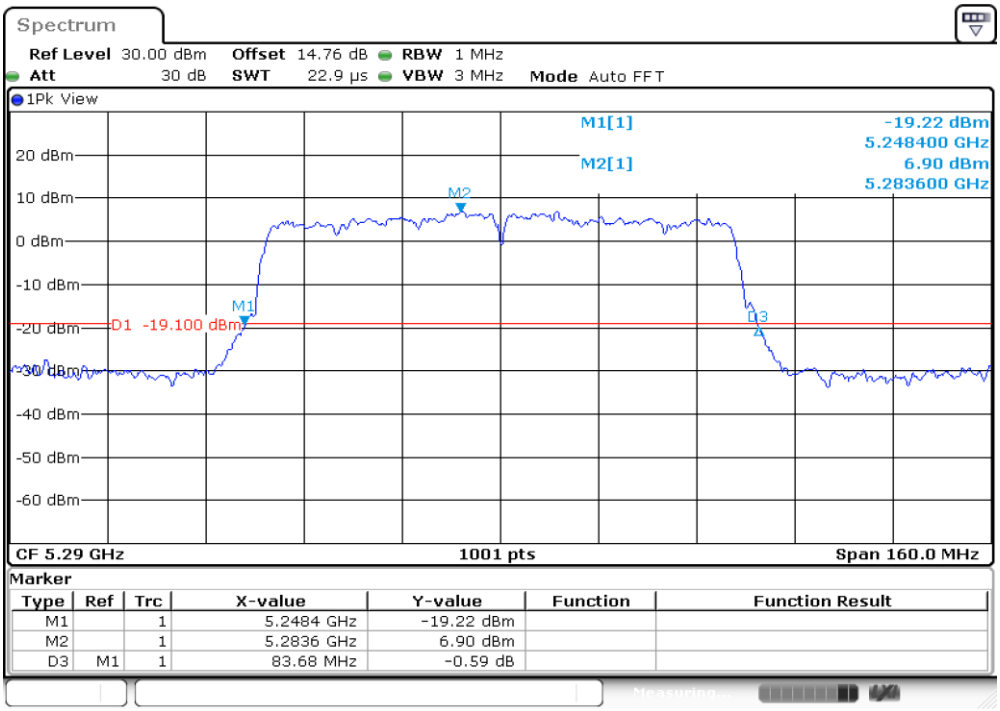

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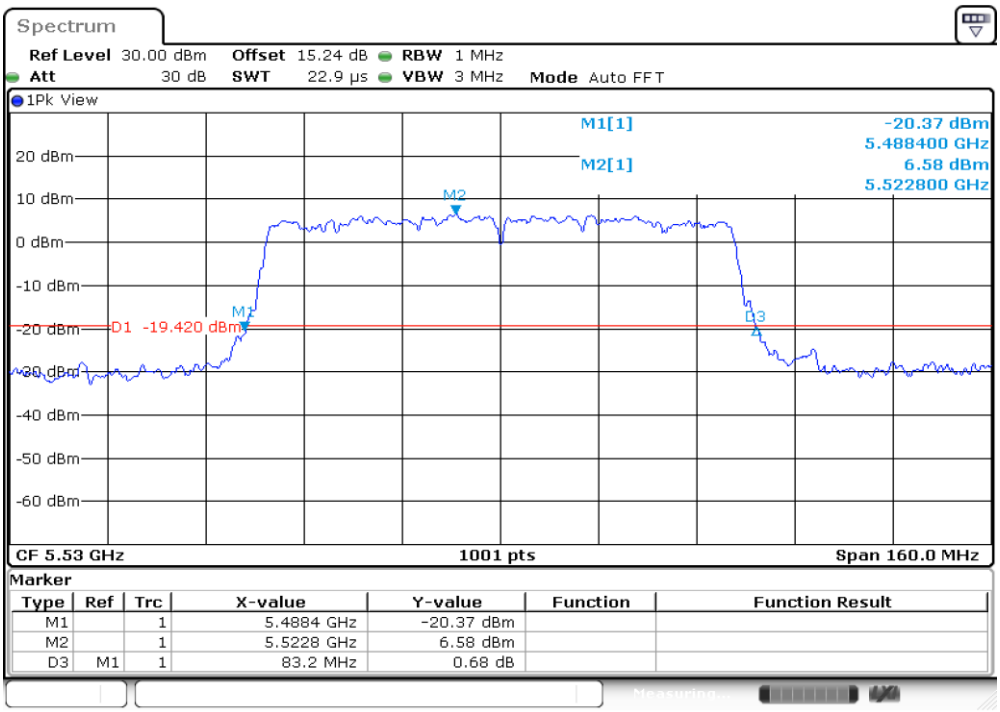

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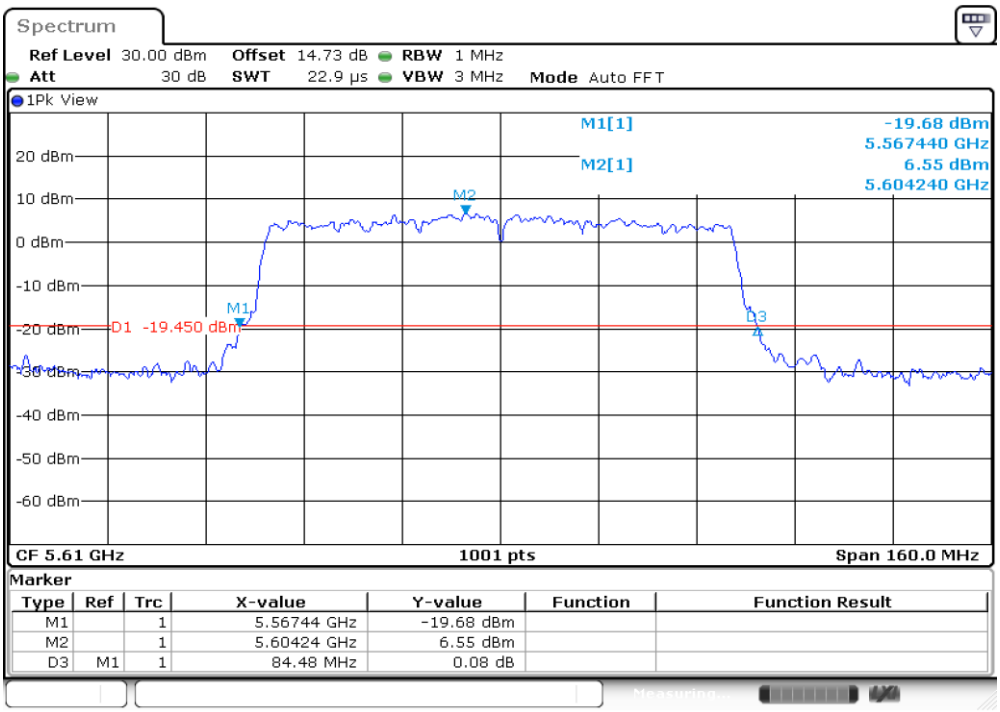

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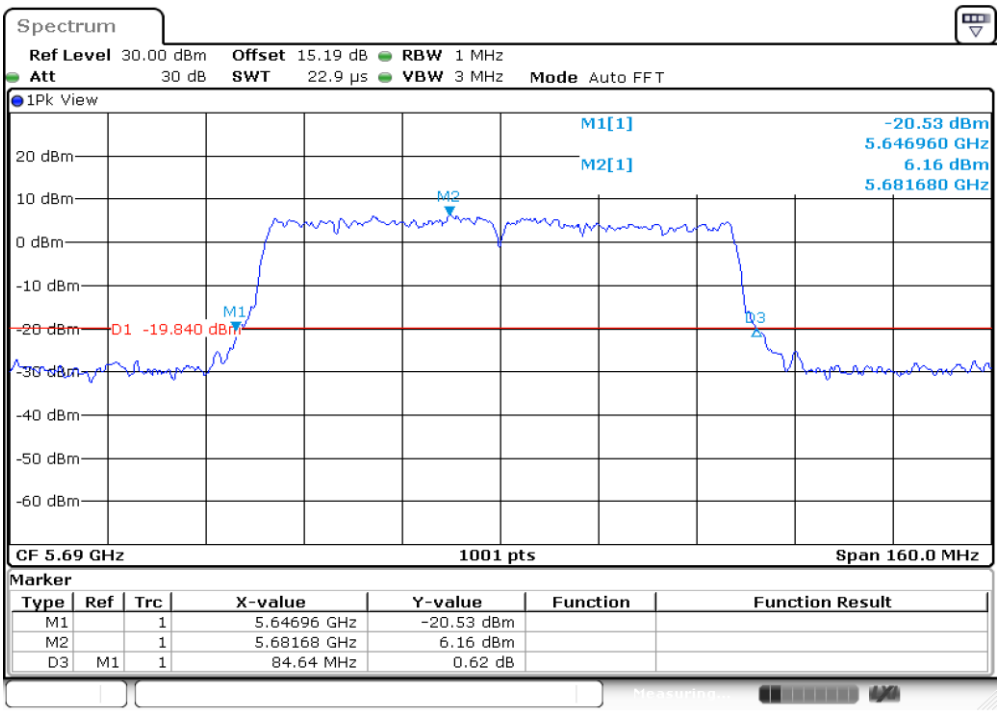

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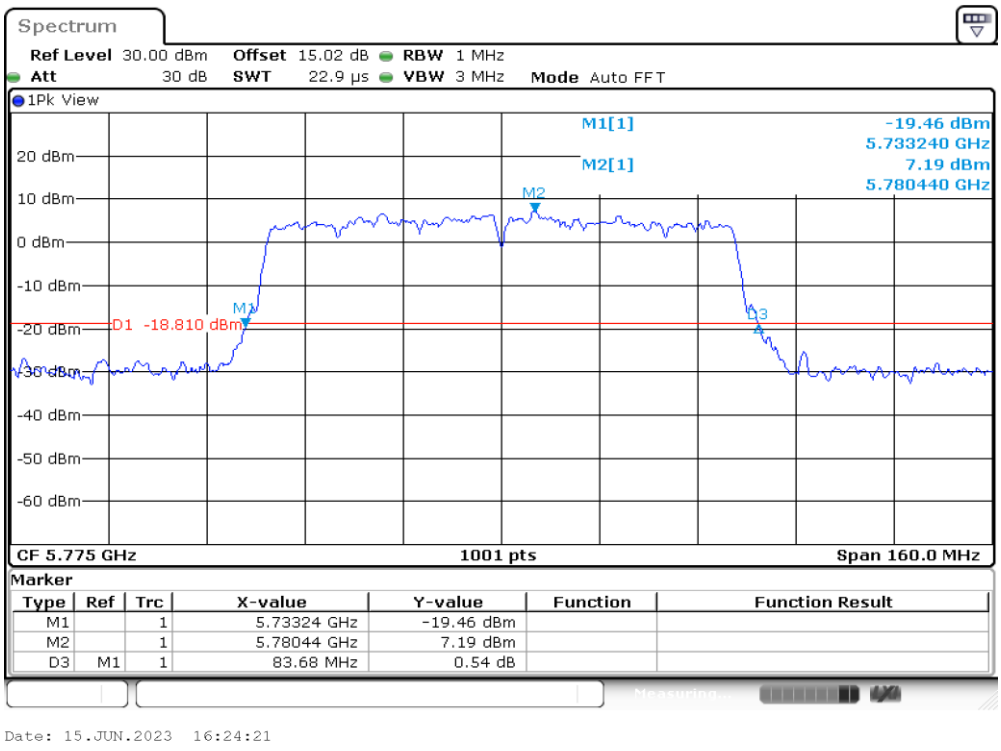


Occupied channel bandwidth

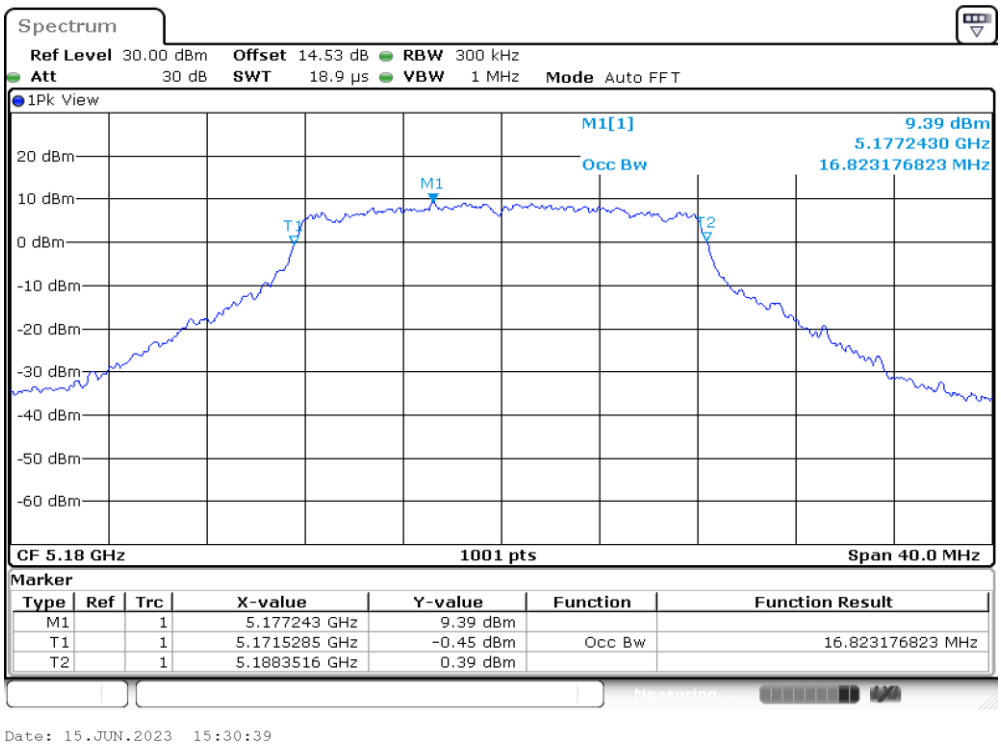
Test Result

TestMode	Antenna	Freq(MHz)	OCB [MHz]	FL[MHz]	FH[MHz]
11A	Ant6	5180	16.823	5171.5285	5188.3516
		5220	16.743	5211.6084	5228.3516
		5240	16.783	5231.5285	5248.3117
		5260	16.743	5251.6084	5268.3516
		5300	16.863	5291.5285	5308.3916
		5320	16.863	5311.5285	5328.3916
		5500	16.783	5491.6084	5508.3916
		5580	16.863	5571.5285	5588.3916
		5700	16.783	5691.5285	5708.3117
		5720	16.823	5711.5684	5728.3916
		5720_UNII-2C	13.432	5711.5684	5725
		5720_UNII-3	3.392	5725	5728.3916
		5745	16.703	5736.6484	5753.3516
		5785	16.783	5776.5684	5793.3516
		5825	16.783	5816.5684	5833.3516
11AC20SISO	Ant6	5180	17.902	5171.0090	5188.9111
		5220	17.942	5211.0090	5228.9510
		5240	17.982	5230.9690	5248.9510
		5260	17.942	5251.0090	5268.9510
		5300	17.942	5290.9690	5308.9111
		5320	17.982	5310.9690	5328.9510
		5500	17.942	5491.0090	5508.9510
		5580	17.942	5571.0090	5588.9510
		5700	17.902	5690.9690	5708.8711
		5720	17.982	5711.0090	5728.9910
		5720_UNII-2C	13.991	5711.0090	5725
		5720_UNII-3	3.991	5725	5728.9910
		5745	17.942	5736.0090	5753.9510
		5785	17.862	5776.0490	5793.9111
		5825	17.862	5816.0090	5833.8711
11AC40SISO	Ant6	5190	36.523	5171.7782	5208.3017
		5230	36.603	5211.6983	5248.3017
		5270	36.444	5251.6983	5288.1419
		5310	36.603	5291.6184	5328.2218

		5510	36.444	5491.7782	5528.2218
		5550	36.444	5531.6983	5568.1419
		5670	36.683	5651.6184	5688.3017
		5710	36.923	5691.5385	5728.4615
		5710_UNII-2C	33.462	5691.5385	5725
		5710_UNII-3	3.462	5725	5728.4615
		5755	36.444	5736.6983	5773.1419
		5795	36.444	5776.6983	5813.1419
11AC80SISO	Ant6	5210	76.084	5171.9580	5248.0420
		5290	76.404	5251.6384	5328.0420
		5530	76.244	5491.9580	5568.2018
		5610	76.404	5571.7982	5648.2018
		5690	76.404	5651.6384	5728.0420
		5690_UNII-2C	73.362	5651.6384	5725
		5690_UNII-3	3.042	5725	5728.0420
		5775	76.084	5736.9580	5813.0420

Test Graphs

11A_Ant6_5180



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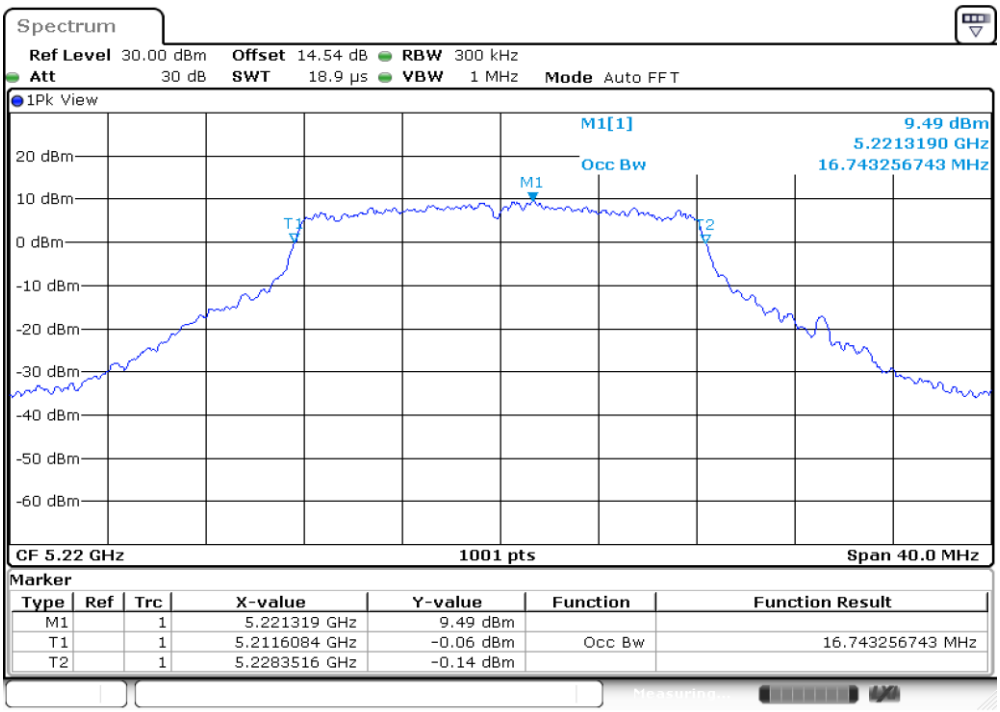

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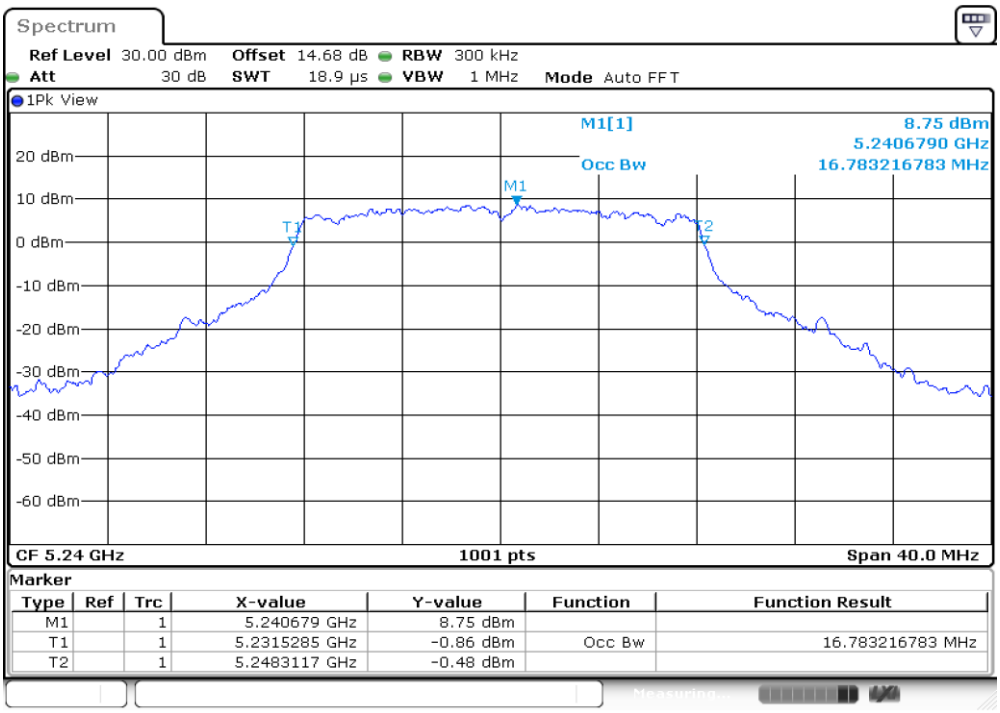

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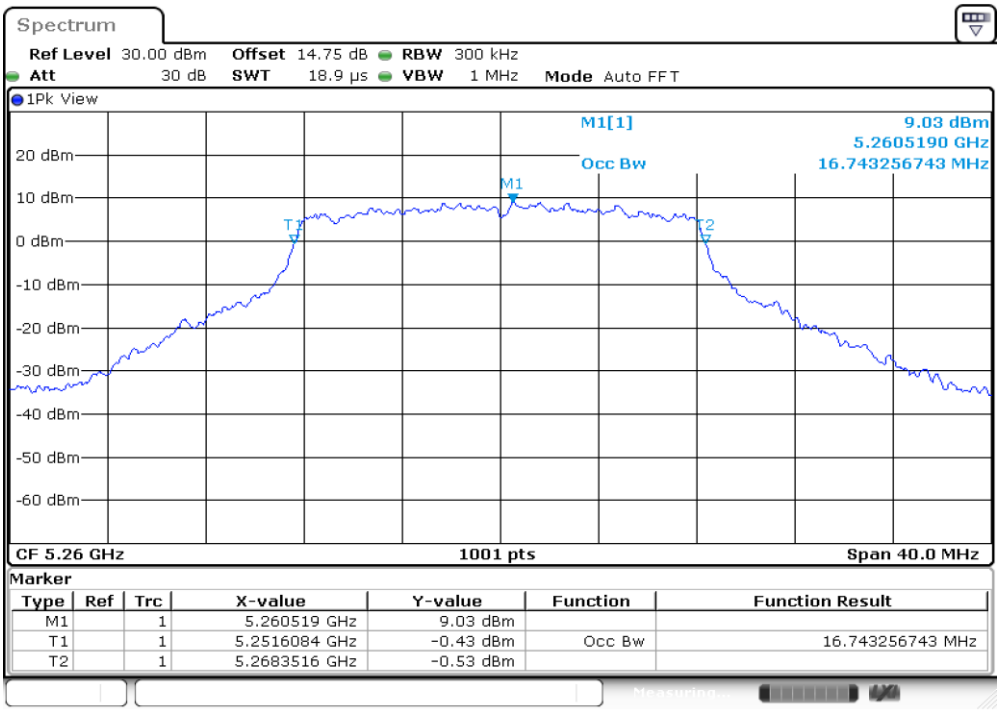

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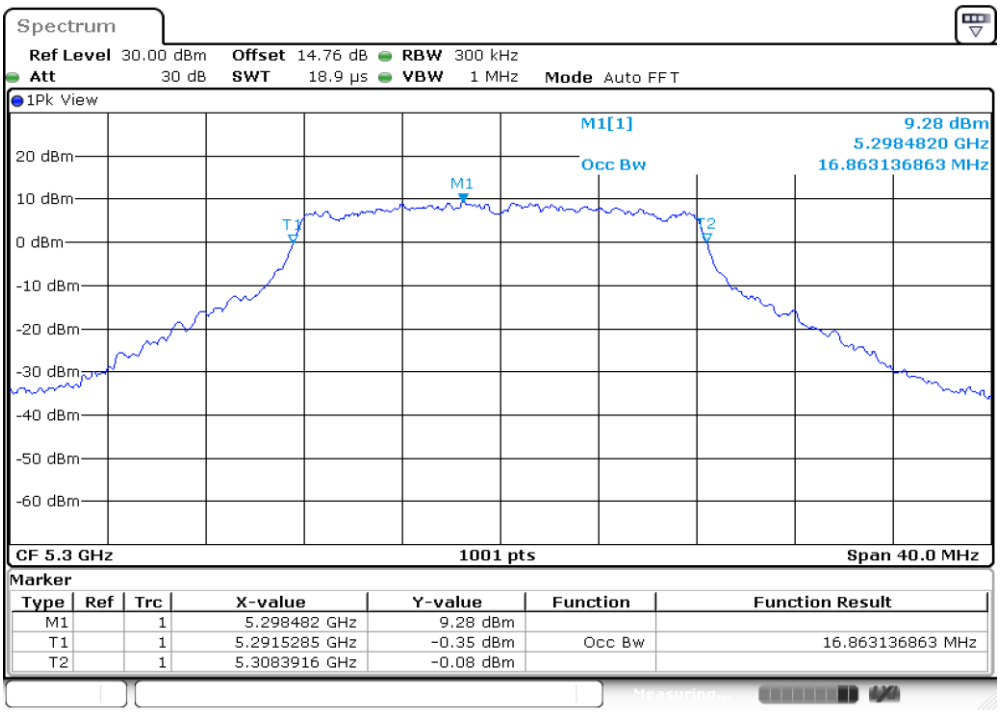

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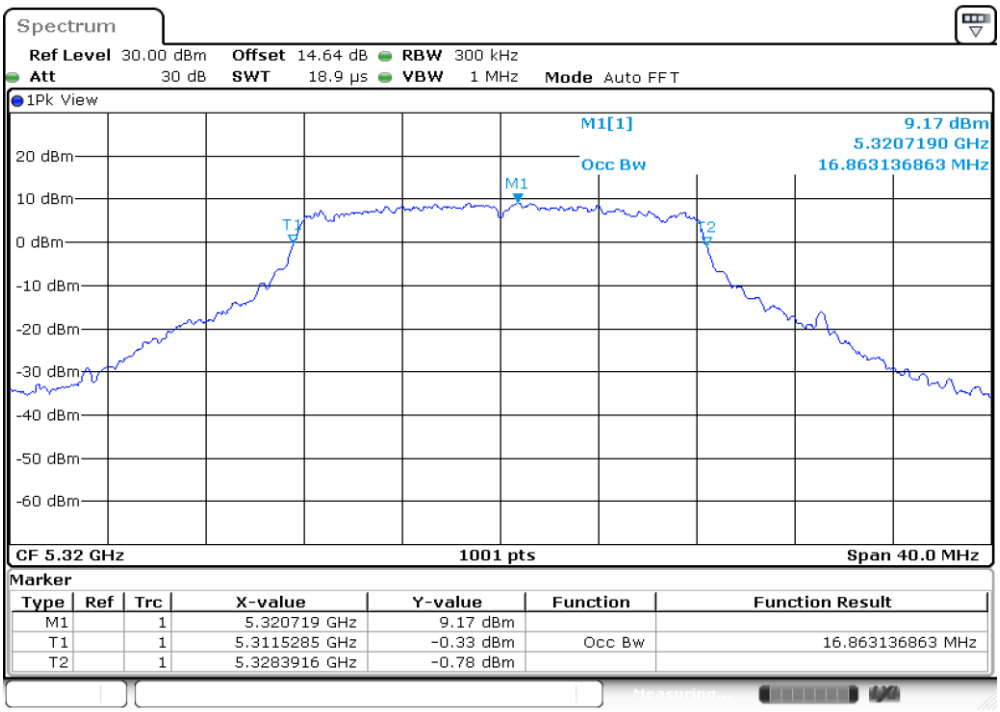

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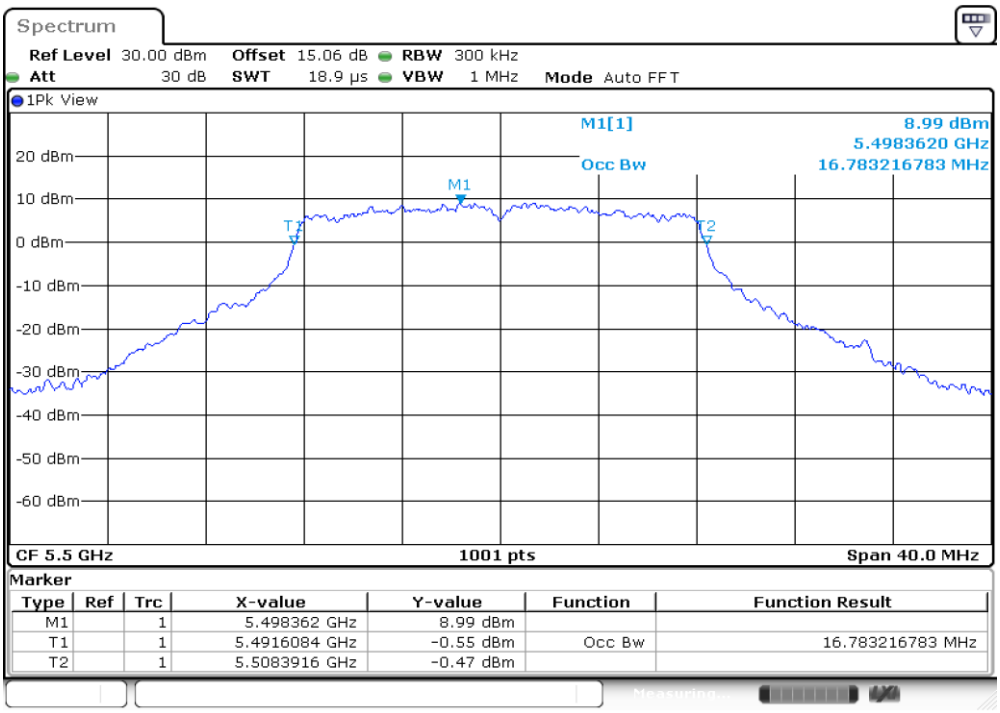

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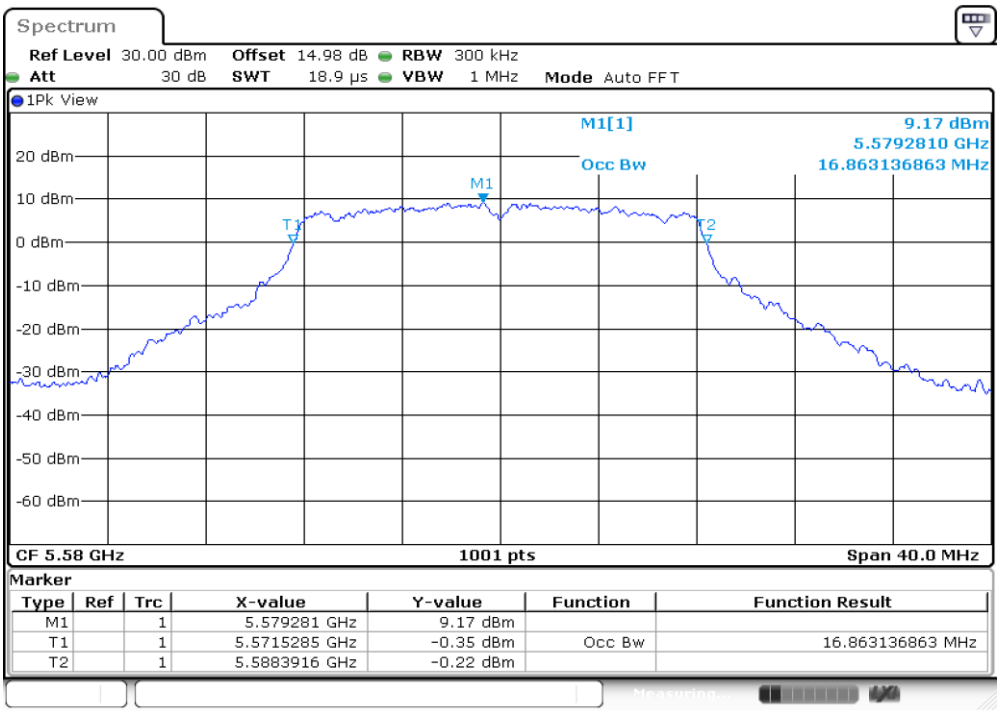
11A_Ant6_5580



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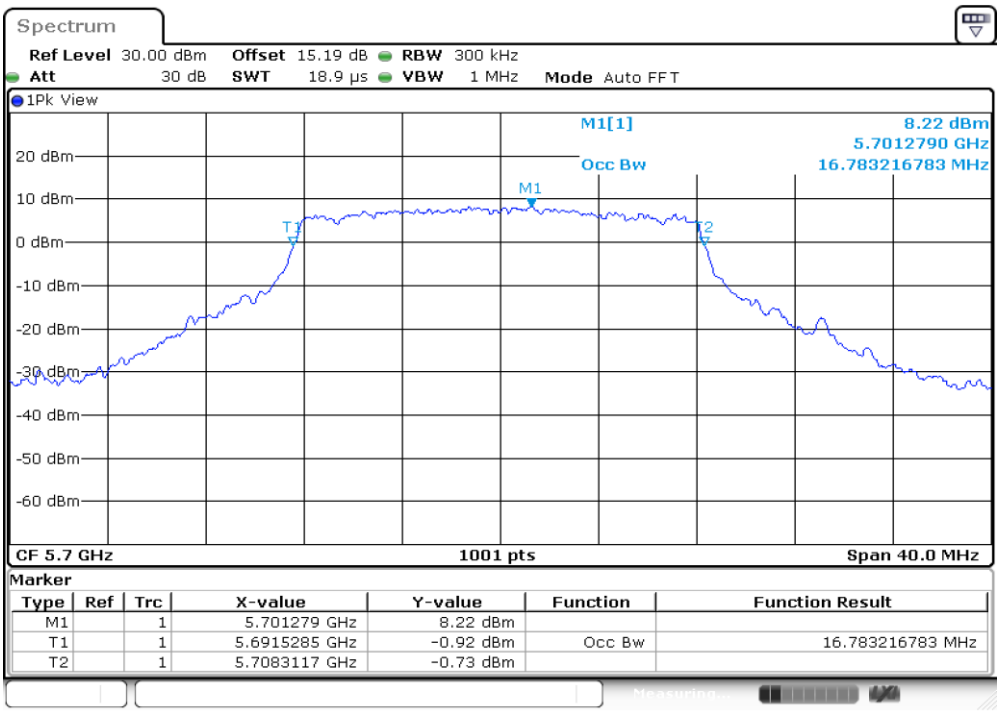
11A_Ant6_5700



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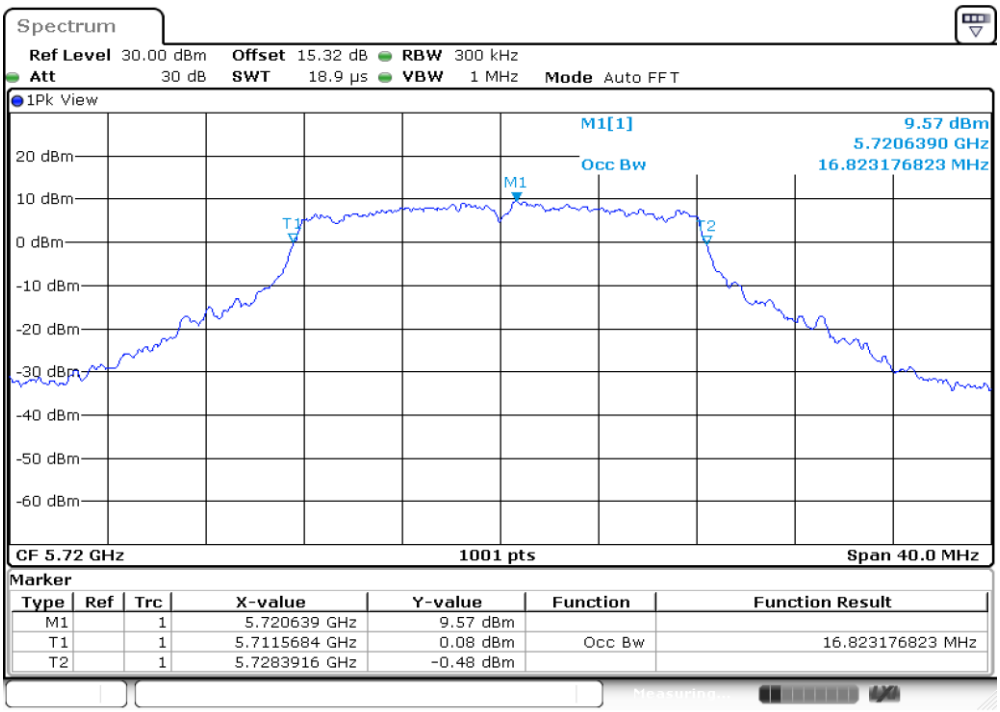
11A_Ant6_5720



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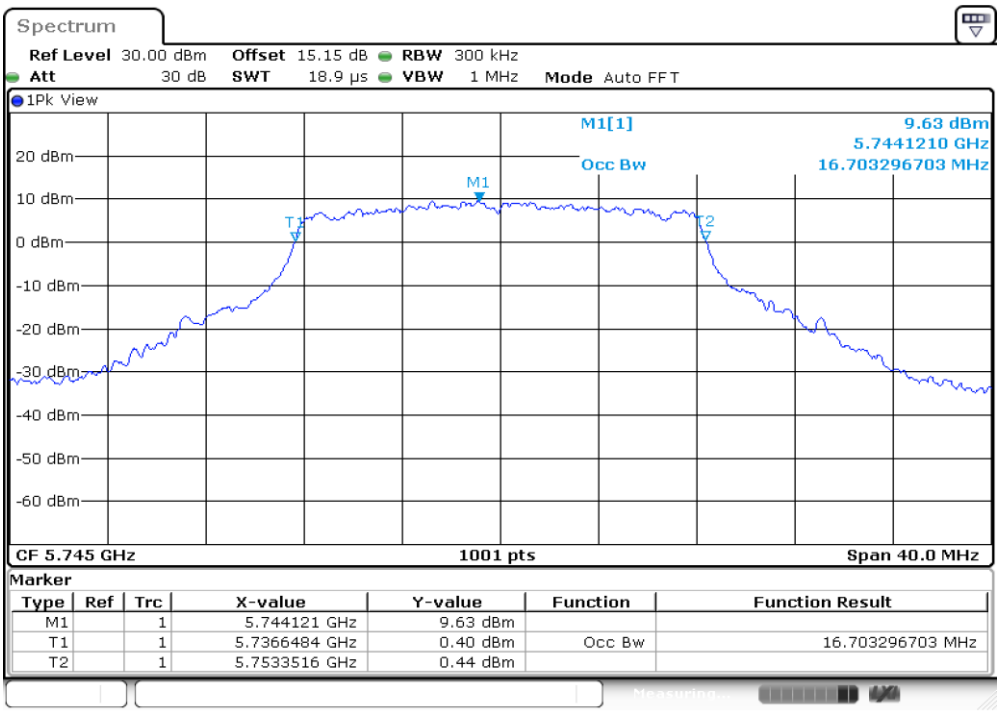

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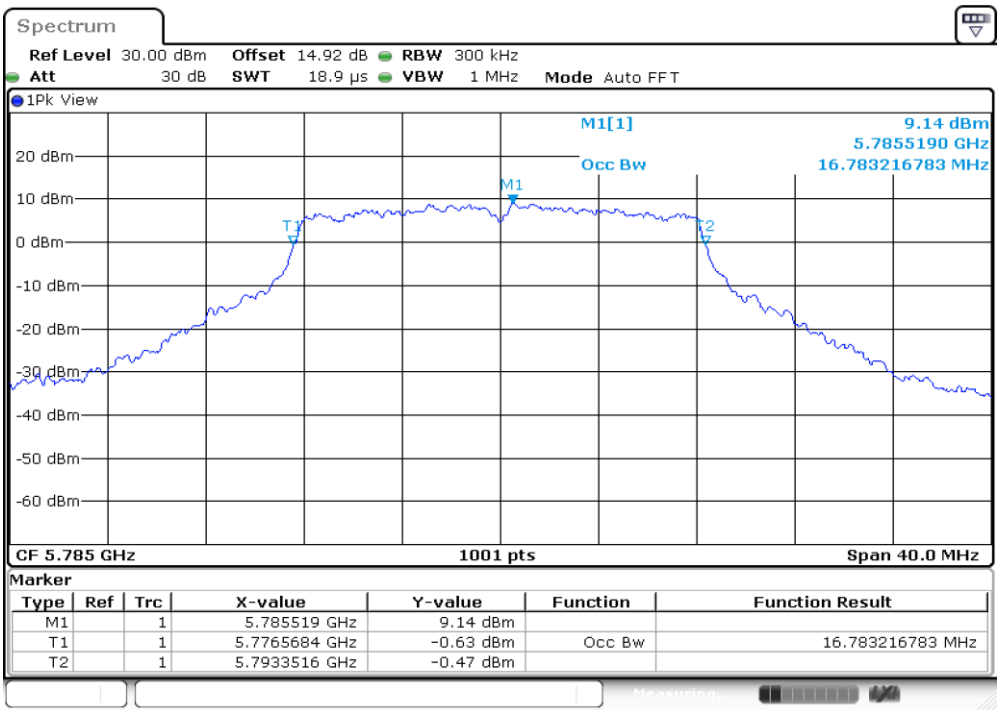

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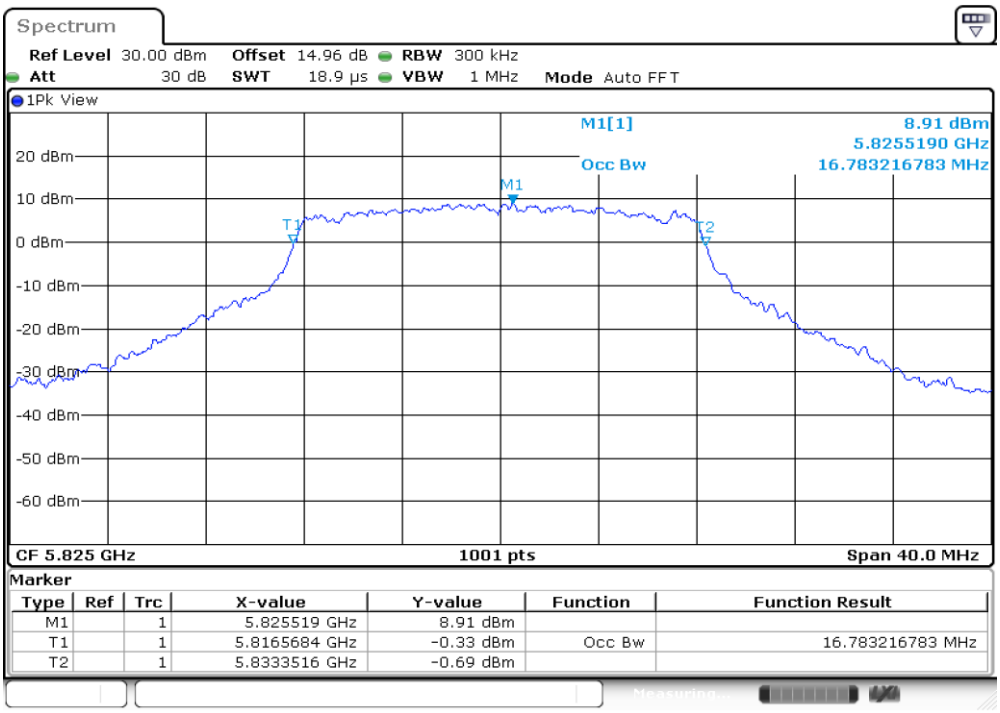

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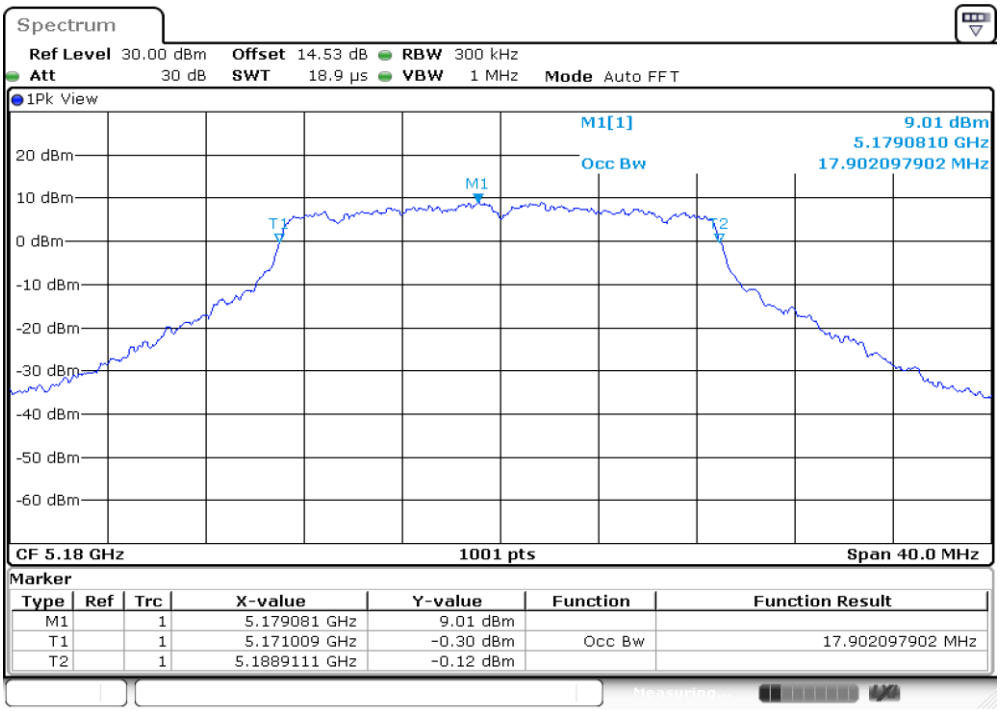

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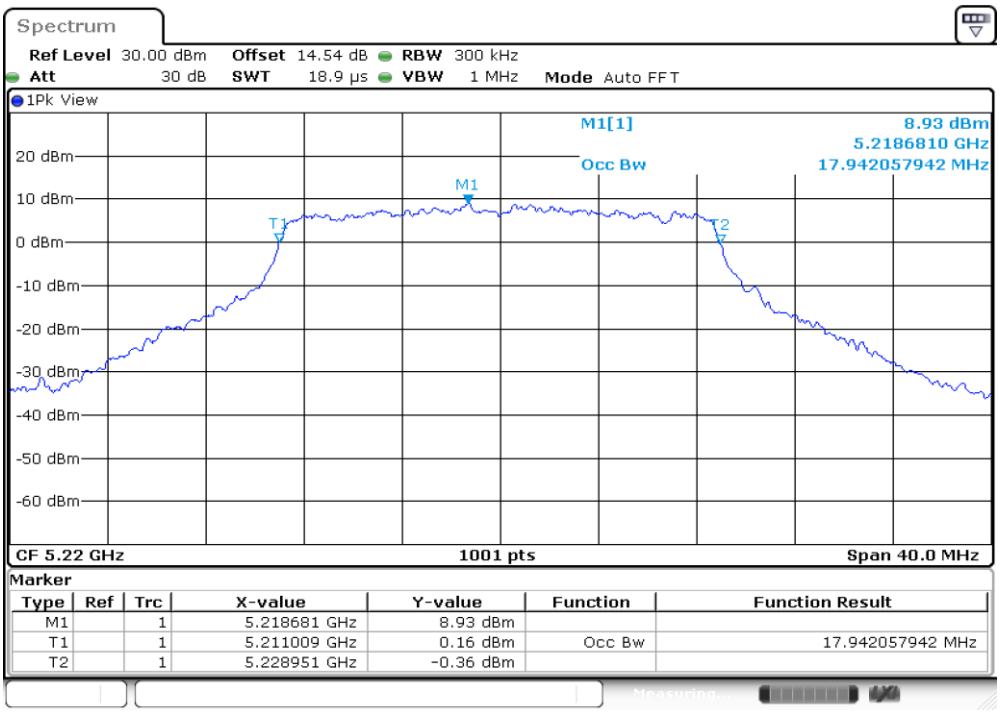
11AC20SISO_Ant6_5220



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